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PLANT EXPLORATIONS

**Ornamentals in
Southern Japan**

September 1957



Agricultural Research Service

U. S. DEPARTMENT OF AGRICULTURE

in cooperation with

Longwood Gardens of the Longwood Foundation, Inc.

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Kyushu Agricultural Experiment Stations at Kurume and Anno
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University of Kyoto, Faculty of Agriculture
University of Tokyo, School of Forestry
University of Kochi, Shikoku

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John L. Creech
U. S. Plant Introduction Garden
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PLANT EXPLORATIONS OF ORNAMENTALS IN SOUTHERN JAPAN

INTRODUCTION

A plant exploration to investigate wild and cultivated ornamental plants was conducted in Japan by the United States Department of Agriculture from September 30 to December 23, 1956. This undertaking was the first of a series of ornamental plant explorations resulting from a cooperative agreement between the Agricultural Research Service, U.S.D.A. and the Longwood Gardens of Longwood Foundation, Inc., Kennett Square, Pa.

The major collecting areas chosen for investigation (fig. 1) were determined from experiences gained during a similar exploration in Japan during May-September 1955. This decision permitted a concentrated investigation of remote regions of southern Japan where extensive broadleaved forests are under imperial control. The exploration also concluded the observations begun in 1955 of the subalpine forests in the Yatsugatake Mountains, Nagano Prefecture. Many of the localities had not been explored by foreign plant collectors since the journeys of E. H. Wilson, of the Arnold Arboretum, in 1914.

In addition to collecting in the wild, a number of small nurseries and plant breeding stations were visited. Since the trip coincided with the flowering and exhibition of chrysanthemums, it was possible to make a rather complete collection of the modern Japanese varieties. A number of woody plant cultivars were also obtained from rare-plant growers in Japan. Many of these varieties, because of the popularity of similar varieties or because they are of the basic species, will be welcomed by the horticultural trade. It is noted that the Japanese are recognized as masters in the matter of varietal selection.

Although collectors have explored Japan frequently, the objectives, in terms of plant materials, have been to obtain types that would prove hardy in the more northerly parts of the United States. This was also true of the 1955 exploration. Most collectors, however, have neglected the regions of warm temperate Japan perhaps partly because the Japanese themselves are not entirely familiar with these places. We would anticipate that the plants native to areas with warm-temperate and even sub-tropical conditions might have distinct limitations in the United States. Yet, an agro-climatic study will show that in terms of yearly variations in climate southern Japan is remarkably like parts of southern United States. A brief survey of the plants grown in the southern nurseries that are popular as garden plants will confirm this statement. It should be noted, however, that most plants were introduced from cultivated sources in Japan rather than from the wild.

We may conclude that there remains in the forests of southern Japan a number of plants, particularly broadleaved evergreens, that are worthwhile testing. These may eventually provide a greater range of ornamental plants for our southern gardens than has been available. Among the many ornamentals native to warm temperate Japan that have become components of American gardens of the south are: Ardisia crenata, Camellia japonica, C. sasanqua, Fatsia japonica, Ilex crenata, I. integra, Ligustrum japonicum, Osmanthus ilicifolius, Pittosporum tobira, Podocarpus macrophyllus, Raphiolepis umbellata, Rhododendron spp., and Viburnum odoratissimum. From the manner in which these species have been adapted to our climate, we can surmise that

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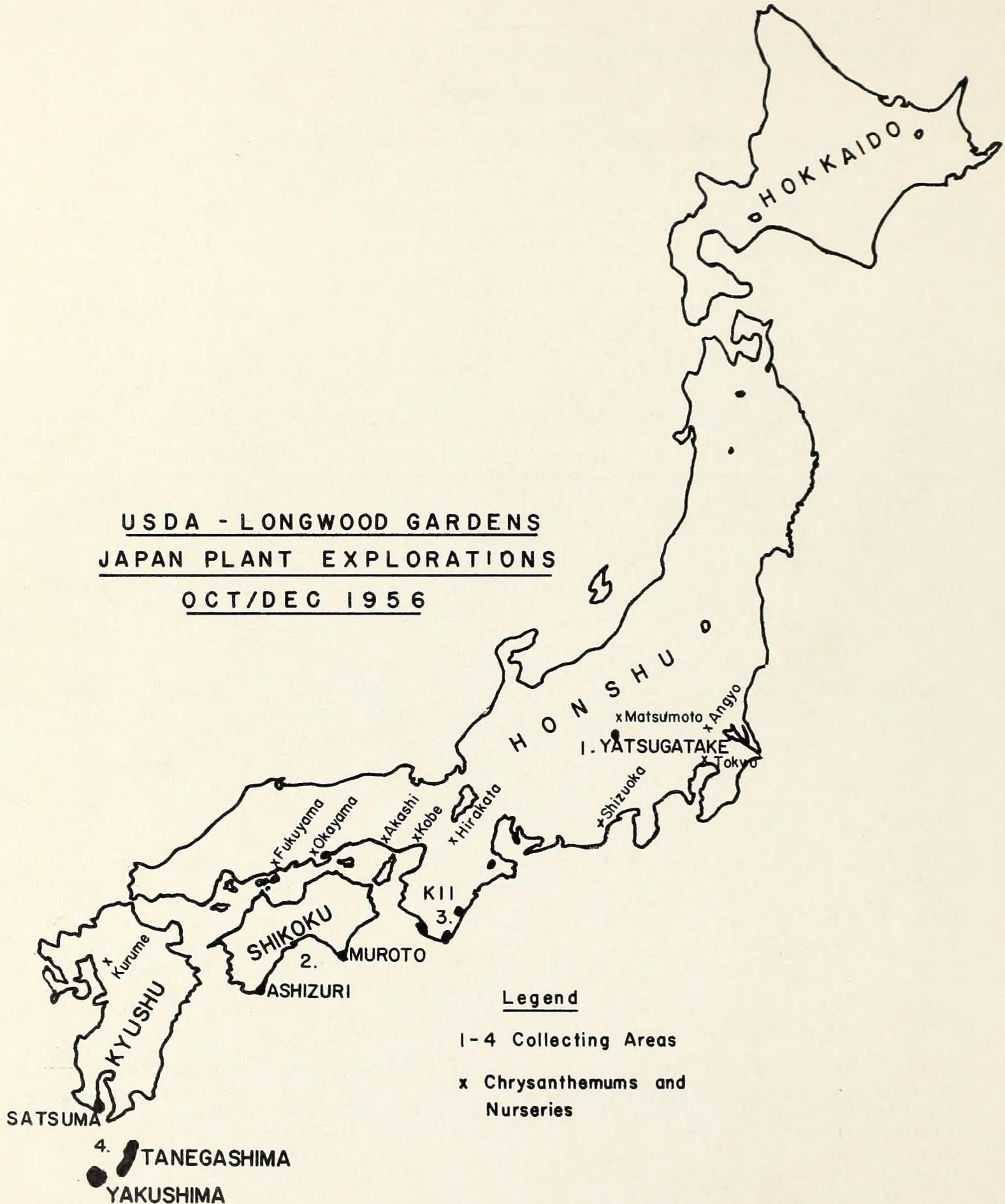


FIGURE 1.--A general map of Japan showing the collecting areas.

those that are yet to be introduced from the forests of Shikoku, Kyushu, and lower Honshu will be interesting with respect to behavior and ornamental merit.

The purpose of the trip was to secure as many species as possible for introduction into the United States to determine their horticultural adequacy.

CLIMATIC ENVIRONMENT AND VEGETATION

Japan, despite being an insular empire, is unique in its climatic status owing to its position off the great Asian land mass and the occurrence of two great monsoons, one during the summer and the other during the winter. The summer monsoon drives up from the southern oceans providing hot, wet weather while the winter monsoon blows steadily down from Siberia so that the winters are colder than might be expected for an island environment. Climatewise, Japan has been compared very favorably to the eastern coast of North America. It has been possible to pinpoint localities from Maine to Mississippi that have climatic counterparts in Japan. On the whole, precipitation in Japan is always higher than in the eastern United States but month-to-month fluctuations in temperature and rainfall, together with the time of spring and fall frosts, find marked similarity. As pointed out earlier, this likeness could preclude a comparable adaptation of woody plants and the great array of Japanese plants introduced successfully into eastern United States during the past 100 years is largely due to the similarity in climate of the coastal areas of the United States and Japan.

The great potential for finding additional plant materials in Japan is explained by the fact that Japan is one of the most heavily forested of civilized countries. Mountain forests occupy no less than 55 percent of the land mass. High rainfall during the growing season, accompanied by adequate temperatures have caused these forests to be luxuriant in woody plants. Because the Japanese have practiced careful silviculture for many centuries, great forests are under imperial control and certain parts of them are allowed to remain in a natural state of development. Collecting is not permitted in such areas, without good basis.

Other forests, such as the forest of the Grand Gegu shrine on Kii Peninsula, are restricted by religious control. Here, collecting is sanctioned only after careful deliberation. To comprehend the magnitude of the virgin forests of Japan and to behold the splendor of luxuriant warm-temperate, broadleaved evergreen forests, it is necessary to make arrangements for an exploration into the restricted tracts where the path, which may begin at a Shinto Torii (gate) or a Buddhist temple, leads into a wilderness carefully protected for centuries.

These broadleaved evergreen forests are found mostly on the islands of Kyushu, Shikoku, and lower Honshu from sea level to 2,400 to 2,600 feet elevation. Above this point deciduous-conifer forests dominate up to about 6,000 feet. Rarely are there true alpine zones in these areas. On the tiny island of Yaku, in the China Sea, however, a zone occurs above the timberline that is alpine where many dwarf plants grow. (This island actually has the highest elevation of all Kyushu.) In certain places, the forests are restricted because the hills fall directly to the ocean in wave-cut plateaus, or the terrain may descend gently to the water so that broadleaved evergreen trees become dwarfed by the constant wind and reduced fertility of the beach area.

The collecting areas, exclusive of the Yatsugatake Mountains, were similar in climatic and geological characteristics. The winters are the mildest of all Japan and are generally cold but accompanied by sunny weather and little rain. January is the coldest month and in southern Shikoku and around the Kii Peninsula, there is a mean January temperature of approximately 43° F. A minimum of 18° F. has been recorded. The frost-free period is between 240 and 280 days; the snow falls six or seven

times during the winter but does not accumulate. August is the hottest month with a mean of 80° F. Rainfall is greatest during the summer months with a July maximum of 8 to 17 inches and least in January with a maximum of 2 to 3 inches. The annual precipitation is between 50 to 100 inches. Tanegashima is similar to the main southern Japanese islands but experiences less cold. Yakushima, however, with its high mountains has a climatic range that varies from frost-free at sea level to severe cold in the uplands (Hana-no-ego--4,800 ft. altitude), where the snow attains several feet and lasts until early March. Typhoons, which occur during September and October, are characteristic of the whole area.

The soils in the mountain forests are Lithosols. They are thin, stony surface soils, acid, and low in fertility. Owing to the rugged relief, their immature nature, and low fertility, forestry is about the only agriculture these regions will support. The best mountain sites are planted to Cryptomeria japonica while Chamaecyparis obtusa will grow well at higher elevations and under the poorer conditions of soil.

COLLECTING AREAS

The general areas where major collections were made are, as follows:

1. The Yatsugatake Mountains, Nagano Prefecture: To continue observations initiated in 1955, on hollies and late flowering azaleas. (Oct. 8-12)
2. The capes of Muroto and Ashizuri, Kochi Prefecture, Shikoku: To explore the cape flora and broadleaved evergreen forests. (Oct. 14-22)
3. A survey of Kii Peninsula, where several climax forests exist. (Oct. 24-31)
4. Explorations on the islands of Yaku and Tanega and the Satsuma Peninsula, Kyushu. (Nov. 16-Dec. 10)
5. Tour of chrysanthemum nurseries and other plant culture centers. (Nov. 4-15; Dec. 12-20).

The discussion of this itinerary is divided into two parts:

1. A general discussion of each collecting trip with comments on the general area, presentation of a few agronomic observations, and notes on plants that appeared to be outstanding or otherwise of interest.
2. A listing of accessions that were obtained and received Plant Introduction numbers. Such listing includes the scientific name, field number, and a brief description. Identity of the accessions is, of course, subject to further verification by the herbarium specimens. In general, however, identifications are fairly accurate owing to the quality of the Japanese assistants who participated in the exploration.

Ornamental plant research workers and others who are concerned with the kinds of plants discussed here may obtain further information by writing to:

U. S. Plant Introduction Garden
Crops Research Division
Agricultural Research Service, U.S.D.A.
Box 88, Glenn Dale, Md.

The Yatsugatake Mountains

(Oct. 8-12)

The Yatsugatake Mountains ($35^{\circ}55' N.$ $138^{\circ}20' E.$) is a group of inactive volcanic peaks arranged in a slightly curved line, running north and south in Nagano Prefecture for a distance of approximately 12 miles. All of the major peaks exceed 7,000 feet altitude, the highest peak being 9,508 feet in altitude. The lower elevations have all been cleared of natural forests and replanted to larch, but above 4,800 feet altitude natural stands of fir and hemlock exist.

We traveled from Tokyo by rail to a small town called Chino, not far from Suwa Lake, where a mountain innkeeper had arranged to meet us with a jeep. The mountain roads are pitifully poor at this time of the year. It required about 4 hours to grind our way up to Shibujo Onsen (inn) which is situated at 4,950 feet altitude. Since we had collected here during the summer of 1955, we were familiar with much of the terrain and the vegetation. Our main interest was to collect late-flowering forms of Rhododendron japonicum. This azalea inhabits open fields, especially the more boggy plateaus. It normally flowers in early May. Both yellow and orange forms grow wild on this mountain. We had observed several orange-flowered plants in bloom on July 20, 1955, but owing to the time of year it was impossible to secure living collections. Therefore, our local collector had visited this meadow during the summer of 1956 and had placed large stakes in the late-blooming clumps. When we arrived in October, the majority of clumps of R. japonicum had already defoliated, but those which were late-flowering held green leaves even at this late date. A number of root suckers and several capsules were gathered from these late individuals for observation and possible breeding.

This mountainous region contained a number of familiar woody plants, many of which are in cultivation in the United States; but there also were species that have not succeeded in cultivation as yet. Of these, Ilex geniculata, a deciduous holly with red fruits on long stalks was the most noteworthy. The edges of the fields and wooded slopes contained such species as: Hydrangea paniculata; Clethra barbinervis, that grew stiffly upright to about 10 feet and terminated in nodding clusters of fruits; Ligustrum ciliatum a spreading privet that usually remained less than 4 feet high; and Sorbus rufo-ferruginea, readily discerned by the brilliance of the red autumnal foliage. Isolated colonies of Chamaecyparis obtusa occurred in open places. We noted a small araliad, Kalopanax sciadophylloides, with a distinct columnar habit on rocky slopes. On the wettest parts of the meadow among cinnamon ferns, Trollius hondoensis, a yellow-flowered perennial and Hemerocallis thunbergii, with lemon yellow, fragrant flowers, prospered. While on bare ground, among stone chips, Scabiosa japonica, mostly purple but occasionally pink or white was still in flower.

Following a trail up into the chilly coniferous forest, we began to explore the area for ground-covering plants. Cornus canadensis, with red fruits, and Linnaea borealis, a white-flowered species, indicate the character of the area for these species are also native to the colder regions of the North American continent. In occasional clearings, Lilium medioloides, with false whorls of leaves could be found. Convallaria keiskei, the Japanese lily-of-the-valley, was covered with orange fruits. Ericaceous plants were abundant of which the following were noted: Pieris nana, Arctous japonicus, Gaultheria miquelianana (of which my guide, H. Takeda is the authority), Rhododendron fauriae and Vaccinium vitis-idaea.

Ilex rugosa, a prostrate, evergreen holly, was a dominant plant along the forest floor. Scrambling over decayed logs and scarcely larger than the thick mats of sphagnum into which it had rooted, this holly covered several acres. Yet only a handful of

the red berries could be collected. This failure to produce an abundant crop of seeds seemed consistent for this species. A number of female plants and some fruits were collected. (It has been recorded by the Japanese that where *I. rugosa* and *I. leucoclada* grow together, a natural hybrid can be found.) After reaching an elevation of about 7,500 feet altitude, we retraced our trail down the mountain to the inn where we assembled our collections, completed field notes, and prepared for our return.

We descended by jeep to Chino pausing along the trail to collect fruits of the many shrubs that grew by the wayside. The scrub was a tangle of deciduous shrubs and vines such as *Berchemia racemosa*, a scandent species with reddish-black fruits; *Lindera obtusiloba*, a small shrub with yellow flowers prior to the leaves in spring; and *Schizandra chinensis*, a vine with whitish flowers in June followed by orange berries in the fall. *Rosa multiflora* and *Rhododendron obtusum* var. *kaempferi* were everywhere. *Enkianthus campanulatus* could be readily distinguished by its whorled yellow leaves. From Chino we returned to Tokyo by express.

Explorations In Southern Shikoku

(Oct. 14-22)

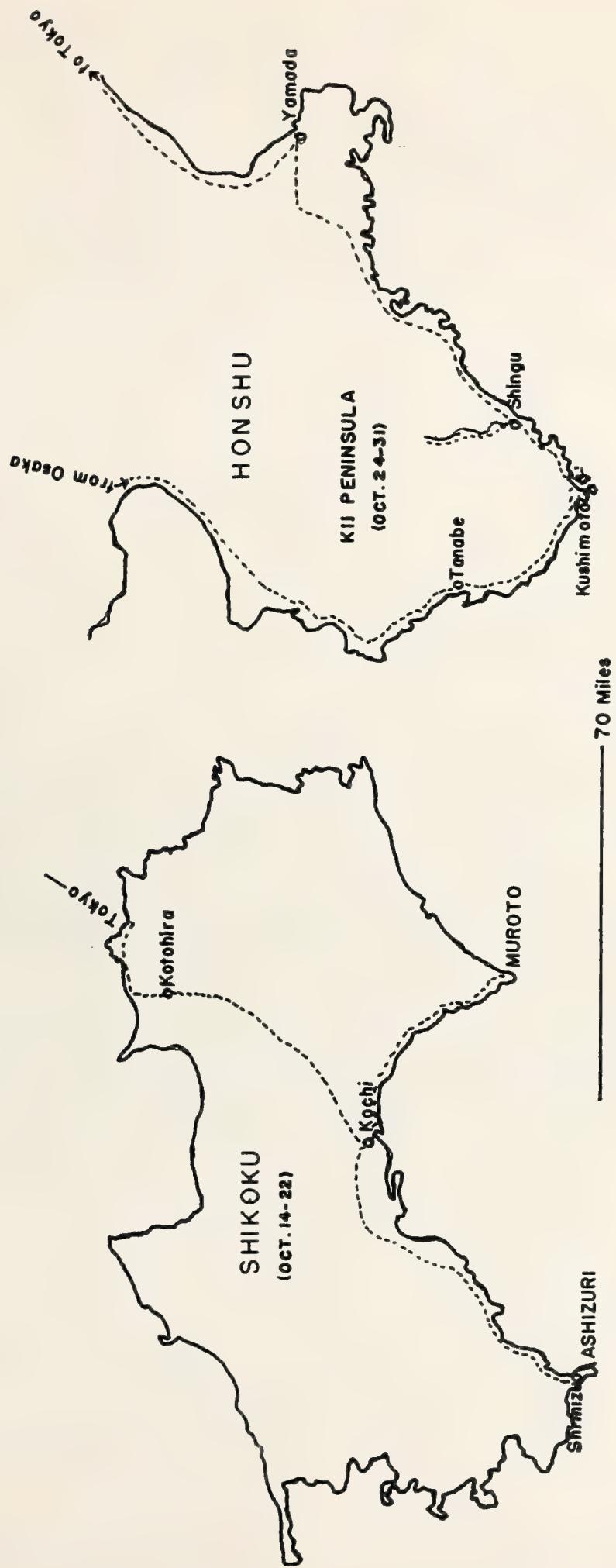
Southern Shikoku (fig. 2) is characterized by two prominent land features--the capes of Muroto and Ashizuri. The climate of this part of Japan simulates central Georgia across to Mississippi, inclusive of the gulf area. The terrain is extensively mountainous. The land may drop to the ocean in steep cliffs that support only herbaceous plants or the descent may be more gradual where broadleaved evergreen forests grew down to the narrow, rocky beaches.

Kochi is the major city, lying inland from Tosa Bay. It is the starting place for any travels to the south. Our first exploration in this area was to Cape Muroto ($33^{\circ}15'$ N. $134^{\circ}11'$ E.). We reached it by traveling on a winding dirt road along a coastline where the black sandy beaches were lined with huge trees of *Pinus thunbergii*, the Japanese black pine. Standing on the beach road at Muroto, one can see a great broad-leaved forest that ascends steeply, presenting a mosaic of greens. The evergreen oaks, *Quercus cuspidata* and *Q. sieboldii*, are among the largest trees in this forest. The more common woody plants in this association were *Camellia japonica*, *Eurya japonica*, *Ficus erecta*, *Ligustrum japonicum*, and *Pittosporum tobira*. Lesser known species occurring here were *Prunus zippeliana*, *Distylium racemosum*, *Machilus thunbergii*, *Ilex integra*, and *Podocarpus nagi*. Shrubs include *Maesa japonica*, *Lasianthus satsumensis*, a rubiaceous shrub with large blue fruits; *Damnacanthus indicus*; *Sarcandra glabra*; and several evergreen species of *Symplocos*--*S. glauca*, *S. prunifolia*, and *S. lancifolia*.

Along the beach, *Quercus wrightii*, with gnarled wind-form, grew among huge rocks. Other salt-spray tolerant plants found just behind the beach, were *Rapiolepis umbellata*, *Pittosporum tobira*, *Ficus erecta*, and *Eurya emarginata*. The narrow, level beach was covered by small stones. Here, *Rosa wichuriana*; *Dianthus japonicus*, with bright pink flowers; *Lactuca keiskeana*, yellow-flowered and with succulent leaves; *Lathyrus maritimus*; and a prostrate legume, *Indigofera pseudotinctoria*, a rugged plant with a deep extensive root system that strongly defied the removal of the shrub, spread rampantly.

The forest was rich in cryptogamic flora. Several interesting ferns, such as the tiny *Pteris cretica* var. *albo-lineata*, *Rumohra aristata*, and *Osmunda bromeliifolia*, flourished. *Psilotum nudum* occasionally could be found among rotted tree stumps.

FIGURE 2. --Map of Shikoku and Kii Peninsula, showing routes of travel and places visited.



At Kochi, we paused long enough to visit a serpentine hill with several interesting deciduous trees and shrubs in the flora. Corylopsis spicata, a deciduous shrub with bright yellow flowers in March, before the leaves, is endemic to this locality. Ilex serrata, a deciduous, red-fruited holly, and Viburnum erosum, a red-fruited species that has never succeeded too well as a garden plant, were noted.

Ashizuri-zaki ($32^{\circ}44' N$. $133^{\circ}01' E$.) is a heavily forested cape isolated except for a narrow road that traverses two mountain passes. Along the valleys, Camellia sasanqua was found in bloom. The trees were 18 to 25 feet tall, evidently escapes for I saw only one locality where this species was probably natural. We journeyed to Nakamura village and traveled through magnificent reforested areas of Cryptomeria to the small port of Shimizu. From here, we traveled to the very tip of the cape, making our headquarters at the forestry bureau official's residence. Ashizuri-zaki ends in an abrupt sea-cliff. At this point, Nakai, a leading Japanese botanist, once counted 148 woody species. The abrupt rocky sea walls encouraged no woody plants but extensive colonies of Hemerocallis aurantiaca var. littorea abound.

It was a most rewarding sight to approach the sea-cliff through groves of gnarled Camellia japonica and to step out onto a terrace of Zoysia japonica to find this beautiful daylily in bloom by the thousands. Peucedanum japonicum with large columbine-like leaves and heads of white flowers was scattered among them.

From the sea-cliff, we returned to the dense undergrowth, heavily populated by gray, distorted, multi-stemmed clumps of camellia. Among the trees not previously noted was Actinodaphne lancifolia, with handsome variegated brown and white bark. Ilex integra occurred frequently; this species had the largest fruit of any Japanese species of holly. Some trees of this species reached 30 to 40 feet. Euonymus japonicus and Pittosporum tobira were seen frequently and lianes and epiphytes were everywhere. Among the ferns, Angiopteris suboppositifolia had fronds up to 9 feet long. A succulent-leaved evergreen tree found here was Ardisia sieboldii. Damnacanthus indicus also inhabited the moist, shaded woodlands, as did Viburnum awabuki. This red-fruited evergreen Viburnum species probably has its northern limit here but grows abundantly throughout the warmer Ryukyu Islands.

As noted previously, Camellia japonica was common but azaleas were almost nonexistent. Neither the common Rhododendron kaempferi nor R. indicum grows here. R. weyrichii was the only extensive species.

Several ancient Buddhist temples have been erected near the cape but few plants of interest have been used in the plantings. Thus we left Ashizuri-zaki, returned to Kochi, and went on to Kotohira City, in northern Shikoku. At our inn, where the 1955 visit was still remembered, excellent quarters were provided. This inn cultivates a fine array of ornamentals, ternstroemia, azaleas, hollies, and numerous herbaceous species, from which a variegated-leaved form of Iris japonica and Ternstroemia makof were secured.

In the enormous Shinto shrine area, many large trees of Camellia sasanqua have been cultivated for centuries. Because these were quite ancient plants and large-flowered, we secured cuttings of each type despite the fact that they were unnamed. A part of the shrine is a Fuji-like hill called Zodzusan. A few plants of Ilex crenata grew on the slopes and Rhododendron serpyllifolium was found. The dominant azalea, however, was the red-flowered R. weyrichii that reached 15 feet in height and had trunks 3 to 4 inches thick. Neolitsia sp., a camphorlike tree, was noted here. It is an evergreen with 2 to 3 red fruits in a cluster. Having visited Kotohira during a journey in 1955 across northern Shikoku, our stay was limited to 2 days. We returned by steamer across the Inland Sea to Okayama and journeyed by rail back to Tokyo.

Kii Peninsula

(Oct. 24-30)

Kii Peninsula (fig. 2), lacking alluvial plains, is isolated by rugged mountains and is one of the least populated areas of southern Japan. Transportation is mostly by coastal shipping or over poor, dirt roads that wind tediously through the mountains. Knowledge of the plants is mostly local but it is said to be unusually rich in various types of evergreen woody plants of a warm temperate and subtropical nature.

The four major stops on this peninsula were:

1. Tanabe and adjoining Kashima ($33^{\circ}44' N.$ $135^{\circ}23' E.$)
2. Kushimoto and Oshima ($33^{\circ}27' N.$ $135^{\circ}46' E.$)
3. Nachisan and Shingu (Approx. $33^{\circ}44' N.$ $135^{\circ}59' E.$)
4. Yamada (Approx. $34^{\circ}34' N.$ $136^{\circ}34' E.$)

Our first collecting locality was a small island called Kashima, near Tanabe. Owing to its sacred status, it has been left entirely to primeval vegetation. Huge trees of Aphananthe aspera, an elmlike species reaching 60 feet, covered the whole island. We also observed that Bauhinia japonica grew as a liana and probably reached its northern limit here. The seeds of this plant are used to make short necklaces for Buddhist ceremonies. Cocculus trilobus grew on fallen tree trunks; it climbed over other plants along the cleared beach. The luxuriant foliage and bright blue clustered fruits made this climber especially attractive.

After exploring this tiny island we continued across the bay to Shirahama, a former pearl culturing center. The hillsides were shaded by some trees of Quercus phillyraeoides larger than usually encountered. These had trunks 1 foot or more in diameter and reached more than 30 feet. It was here that Ardisia villosa was first encountered and grew as a restricted ground-covering plant in shady places. Calli-carpa mollis, with small purple fruits and very hairy leaves reached 10 feet but it is definitely inferior to others of this genus from an ornamental viewpoint. Of the ferns, Dicranopteris dichotoma may be of garden use. The rhizomes are thick and ramifying and the fronds are evergreen and deeply pinnate. The area was rather disturbed and only a few wild plants of interest were noted. Therefore, we left the locality and traveled by 3rd class train down to the lowest point of the Kii Peninsula, stopping at Kushimoto. From here we took passage to a small island called Oshima. This is a typical fishing community where little agriculture is practiced. Occasionally we found small orchards of a citrus, Fortunella margarita. The natives surrounded their homes with tall hedges formed from Distylium racemosum, an evergreen tree native to the island. A small experimental garden is maintained by Kyoto University where Camellia oleifera is cultivated for oil. Of the plants which occurred along the trails, Ilex rotunda, with its dense clusters of small red fruits and glossy, entire leaves was the most outstanding tree. Other species noted were Dendropanax trifida, with its 3 to 5 lobed leaves; Machilus thunbergii, Rapanea nerifolia, an evergreen tree or large shrub with narrow oleanderlike foliage, and Viburnum japonicum, an evergreen, red-fruited species pendant with heavy fruit clusters. The tiny ground-cover, Trachelospermum asiaticum, also was abundant. The most common cultivated plants were Alpinia and Crinum asiaticum. Crinum asiaticum has huge seeds that resemble bulbs. According to the local farmers it is highly resistant to salt water.

At Nachi, there is a densely forested tract that is a part of the famous Kumano Gongen Shrine. Several small streams flow through the region that merge into a waterfall about 400 feet high. We pursued a trail above this fall through a planted forest of Cryptomeria japonica and into an uncut jungle of vines and dense shrubs. Euchresta japonica, an almost extinct evergreen legume with dark purple fruits, was fairly common. During my previous journey to Japan, I had searched widely for this species for it is reputed to be of medicinal value. I had previously located only a few plants that were protected against collecting. Here, it was fairly common. Lasianthus satsumensis and L. japonicus also flourished. These species bore both clusters of small white flowers and pale blue fruits. Horticulturally, their differences are minor but I do not know that they have ever been tried in cultivation in the United States. A small, succulent ground cover spread over moist rocks and poked into the stone walls. This urticaceous plant, Pellionia minima, with purplish-green stems is a plant for dense shade, coolness, and high moisture.

After traveling up through the forest for several hours, we reached the top of the pass where hemlocks and falsecypress towered. There were the usual orchid epiphytes, but it was impossible to reach them as the trees grew off at an angle from the edge of the cliff. Even the local forester, who normally would climb any tree, declined to attempt the collection. Frequently, we collected orchids where cryptomerias had recently been cut and still lay on the ground.

Descending from the pass, we plunged into a damp, gloomy woods along the stream and came upon a second but smaller waterfall. Here, the filmy ferns, Hymenophyllum, grew in the stream-eroded, dripping walls. At drier localities we observed several ericads, such as Rhododendron serpyllifolium, the azalea with the smallest leaves being less than one-fourth inch long, and a leafless ericad, Hugeria japonica. It more nearly resembled an epiphyte than a terrestrial plant. Asarum, the wild ginger, was rather common, sometimes with plain green heart-shaped leaves but occasionally with richly mottled foliage. A cold rain dampened the whole aspect during the return journey. Later at the city of Shingu we paused to inspect a floating sphagnum bog and found it to be a composite of cool-temperate and warm-temperate plants. Ilex sugeroki, I. serrata, Photinia villosa, and Daphniphyllum humile were all characteristic of northern Japan. During some era, warm-temperate plants such as Vaccinium bracteatum, Ardisia villosa, Pittosporum tobira, and Myrica rubra had invaded the bog to thrive in this soggy environment.

From Shingu, we traveled by jeep and bus over Yanokawa Pass (2,400 ft. altitude) to Oase. At first the vegetation was warm-temperate but at the top of the pass, distinctly cool-temperate plants flourished, namely, Ilex geniculata, with red hanging fruits, Prunus serrulata, Cornus kousa, Pieris japonica, and many trees of Carpinus, almost covered with ripe seeds. Shortly after we had passed the summit and began to descend, Camellia japonica became noticeable and huge specimens of Idesia polycarpa, with red, grapelike clusters of fruits towered above the road.

Our final stop on Kii Peninsula was the forest of the Grand Shrine of Ise, particularly in the Jingu shrine. This is the finest example of Shinto shrine architecture. The temples are constructed entirely of Hinoki cypress, polished to a brilliant orange. To provide the timber to continue the erection of new structures, a large forest of Hinoki cypress is maintained. A part of the forest is permitted to develop naturally and collecting is rarely sanctioned. Fortunately, the chief forester was a student of our guide, Dr. Takeda, and we gained entrance. This area is unusually warm and some subtropical species grow here. The main forest is said to contain trees over 1,000 years old. A small stand of Loropetalum chinense occurred and was thought to be natural. There are only ten trees but apparently it was abundant several hundred years ago. The trees are multistemmed, about 20 feet tall, and bloom both fall and

spring, with tiny whitish flowers. (This species is hardy at Glenn Dale, Md., often remaining somewhat evergreen in winter.) The principal trees are the evergreen oaks, Quercus cuspidata and Q. glauca but of greatest interest was the evergreen Symplocos species, which were large trees. One in particular, Symplocos theophrastae, had leaves that resembled Ilex latifolia; several times seedlings were shown to me as that holly. Prunus spinulosa, a rare evergreen cherry with spiny, crisp leaves, occurred here. This tree should be a fine addition to our southern gardens for its foliage is handsome and it grows rapidly, reaching 20 feet in height. It can be increased by cuttings easily and it transplants well. We had seen Damnacanthus indicus several times earlier. This is a remarkable small plant, with its foliage and branches in fanlike arrangement. But a different species occurred here. This was D. macrophyllus, a larger shrub, with leaves about 1 to 2 inches long, purple colored when young. It is spined and has red berries. Pellonia, Ficus pumila, Ardisia japonica, A. villosa, Trachelospermum asiaticum, and Epimedium macranthum are good ground-covers which thrived in this forest and should be tested as such. A notably good representation of holly species was found, namely, Ilex crenata, I. hanceana, I. integra, I. pedunculosa, I. rotunda, and I. serrata. Ilex latifolia was said to occur but I saw only cultivated specimens. In the arboretum, several conifers flourished but I was surprised to find Sciadopitys verticillata growing so well in a warm-temperate atmosphere. We gathered several cones and extracted a quantity of seed. The seed of this species germinates immediately when fresh.

While most of the trees were of academic and horticultural interest, several were of religious significance. In addition to the use of Hinoki cypress for all construction, Meliosma rigida was used in a whirling gimlet to ignite sparks as it bored into a block of Hinoki. The same method has been used for centuries to light the fires in the temples and the practice is continued today.

During our stay at Yamada city, we visited a grower of curious varieties of Psilotum nudum. This rare cryptogam was in vogue for centuries. As many as 200 varieties had been developed with cristate and distorted stems. This leafless plant makes interesting pot subjects and is easy to cultivate. Gradually, interest in this plant has diminished; today, scarcely 30 types are cultivated. Several kinds were purchased and brought back to the United States for observation because they are not known in our culture and will shortly cease to exist in Japan. From Yamada we returned to Tokyo to ship our collections and to prepare for our next journey.

(Although the period of November 1-15 was devoted to a tour of chrysanthemum nurseries and other horticultural centers, to permit continuity of the collecting in the wild, discussion of the chrysanthemum tour is presented on page 18.)

Yakushima, Tanegashima, and Southern Kyushu

Nov. 16-Dec. 10

Yakushima and Tanegashima lie about 70 miles off the Kyushu port of Kagoshima, at the edge of the China Sea. The islands form a part of the chain extending from Kyushu to Formosa and are a part of the Prefecture of Kagoshima. These islands have been a constant collecting ground for Japanese botanists. Yakushima, in particular, has been noted for the extent of its woody flora and E. H. Wilson considered it "a plant collector's paradise."

We first visited the agricultural experiment station at Kurume, Kyushu, to outline the course of the exploration. It was also intended that some of the collections would be sent only as far as Kurume to be held until our return. Two members of the station staff, Mr. S. Abe and Mr. T. Tamoura, took part in the journey, acting as

guides and collecting plants that were of interest to them. Prior to leaving Kyushu, we visited the University of Kagoshima where herbarium specimens and plant lists of Yakushima are held. The local botanist, S. Hatsushima, was able to pinpoint areas that would be worth visiting to obtain rare species.

Yakushima (fig. 3) is a small, round island about 14 miles across. It is surrounded by the highest peaks of the Kyushu area. The highest mountain is Miyanoura-dake (6,348 feet altitude). The flora of this island closely follows the geological structure, of which granite represents about 70 percent of the land mass. This formation covers the central part of the island and extends to the western side. Surrounding this is a horseshoe-like region of mesozoic rock that extends from the northern side of the island to the southwestern side in a band from about 300 feet to 1,800 feet in altitude. The vegetative units are largely determined by these two geological formations. A coastal savanna occurs along the river estuaries. Near the mouth of the Kurio River, a true mangrove formation of Kandelia cande has developed. The broadleaved evergreen forests occur up to about 1,800 feet altitude. Above this is a vast stand of conifers, mainly cryptomeria and fir, with some deciduous trees, up to 5,500 feet altitude. Above the forested zone, a subalpine climate prevails; here, the plants are mostly dwarfed. The chief species is a rampant bamboo, Sasa owatarii. The climate and vegetation vary from subtropical through cool-temperate to sub-alpine.



FIGURE 3.--Map of Yakushima, showing routes of travel on the island.

The most rewarding collecting areas followed the formations of mesozoic rock, roughly from the village of Nagata on the northwestern coast to Kurio on the southwestern side. These villages mark the limits of the broadleaved evergreen forests. The western side of the island is notably poor in plant communities since the granite formation abuts the ocean. No towns or passable roads exist on this part of the island.

About 1,100 species of plants are listed for Yakushima. These may roughly be divided into the following groups: Cryptogams, 212; gymnosperms, 14; dicots, 609; and monocots, 280. These species extend over the entire island since only the small alluvial areas are cultivated. Thus, it was necessary to make a complete tour of the island in order to observe the major communities of plants.

Forestry is the major agricultural pursuit of Yakushima. The logs from the stands of cryptomeria are especially prized for their beautiful grain and used mainly for veneer for Japanese homes. Cryptomeria from this island is called "Yakusugi." A secondary forestry industry is the distillation of camphor oil from Cinnamomum camphora.

Certain areas on the warm southern side of Yakushima are devoted to the culture of a large, loose-skinned sweet citrus called Ponkan. It is a special product of the island. The trees are grafted onto either the wild Citrus tachibana or Poncirus trifoliata.

The population of Yakushima is scattered around the perimeter of the island in a series of small villages, of which Ambo is the largest, and Miyanoura is next. Both ports are shipping centers for cryptomeria logs. A single mountain village occurs about 2,500 feet altitude at Kosugidani and it can only be reached by a narrow-gauge lumber railroad. An airstrip for light aircraft having just been completed at Koseida, it was possible to fly out living collections to Kyushu. From Kyushu, the plants were taken to Tokyo by rail and then sent by the Agricultural Attaché to the U.S. D.A. Plant Inspection House, Washington, D. C.

Prior to the present collecting trip, E. H. Wilson last collected on Yakushima for the Arnold Arboretum in 1914. However, the Japanese botanists have been very active in vegetational surveys so that it was possible to determine exact locations for some of the rarer species, for example, Ilex liukiuensis that occurs only along the Isso River and Lagerstroemia fauriei that was isolated in the hills above Kurio. There remains on the island a relic which is called "Wilson's stump", for when E. H. Wilson viewed this cryptomeria, he remarked that it was the largest living specimen he had seen. The stump is 35 feet across at the base.

We traveled first to the northern part of the island as far as the Nagata Light. Camellia sasanqua grew wild along the beach road and was covered with flowers of various sizes but always pure white. In the undergrowth and on rocky ledges, Ligularia tussilaginea was particularly abundant and conspicuous because of the heads of bright yellow daisylike flowers. Hibiscus mutabilis was also in bloom, with large pink or white blooms but aside from these, the great show of color was that provided by the fruiting of the many woody plants. Occasionally terrestrial orchids were in flower but in most instances these were inconspicuous.

The Isso River drops swiftly from the mountains. We followed its twisting course back up into the hills, often crossing from bank to bank by leaping over gigantic granite boulders that were lodged in the streambed. Often the trees and shrubs grew in midstream where the rocks had accumulated debris and soil. It was in such a locality that we found Ilex liukiuensis. This evergreen holly was prolific in its fruiting

habit and the berries were bright red. It has never been in cultivation. Ilex integra also occurred along the banks of the Isso River. In shady places, Sarcandra glabra was a common shrub and bore terminal clusters of either orange or red fruit. On the rocks and along tree trunks, climbing ferns were frequently seen. Of the trees observed along this river, those which should be of ornamental interest are: Elaeocarpus japonicus, an evergreen tree with gray bark, leaves more-or-less whorled, and racemes of blue fruits; and Stachyurus lancifolius, a deciduous tree with small yellow flowers before the leaves. Of the terrestrial orchids, several species of Goodyera with distinct leaf markings grew in the damp humus. A Calanthe with spikes of bright yellow flowers was in full bloom and the most colorful of the orchids for it occurred in colonies of possibly fifty plants.

Returning along the sea road, we found Smilax china scrambling on the sunny banks. This vine is almost thornless and has large red berries. Kadsura japonica, Morinda umbellata, and Alpinia kumatake were abundant on the roadsides. Elaeagnus crispa was widespread in abandoned fields and along the roadsides. The berries sometimes were quite large and edible. They were about the size of a wild cherry and acid.

We returned to the small inn at Miyanoura, packed plants for air shipment, sorted out seed lots to dry, and assembled the dried specimens. Our next trip surveyed the Miyanoura River which drops gently from the hills and has a broad alluvial plain. Along here we inspected several small camphor distillation plants. The outstanding shrubs along the trail were Callicarpa japonica var. luxurians and C. tosaensis. These grew to 15 feet, overarched by ponderous clusters of purple fruit. I have never observed Callicarpa fruiting so abundantly in cultivation. As we entered the denser part of the forest, Asarums appeared in numbers. This shade-loving plant has large heart-shaped leaves mottled with many combinations of green. It grew in various habitats, sometimes on the forest floor in humus and again clinging to the sides of steep rocky streambeds. The leaves were 6 to 8 inches long.

As we reached higher elevations, the vertical, eroded stream walls were pocketed with small plants of Rhododendron indicum and in midstream the plants developed into dense, low thickets. Surprisingly, many of the plants were in full bloom although it was November. Camellia sasanqua, bloomed along the river bank. The combination of the brick-red azaleas and the white camellias was a magnificent color display. Stepping back a few paces into the damp forest, we found the small but always delightful Damnacanthus indicus covered with red berries, and the previously noted Calanthe covering a swale with its spikes of yellow flowers. The trees were entwined with Psychotria serpens, an evergreen vine that has white fruit.

Having explored the broadleaved evergreen forests of northern Yakushima, we moved our base camp to the forestry office at Ambo. We ascended Miyanouradake by a small lumber train to as far as the camp called Kosugi-dani, about 2,500 feet altitude. The forests had begun to lose their evergreen character although Camellia sasanqua still occurred sporadically. We counted hundreds of trees of Stewartia monodelphia which were completely defoliated but spectacular with their polished orange trunks that stood out from the dark cryptomeria foliage. This tree was especially prolific in the mountains, sometimes reaching 50 feet in height. The trail to the upper meadows of Miyanouradake led through the large forests of cryptomeria and firs. Along the way, large clumps of Rhododendron metternichii grew everywhere. Sometimes, large branches of the conifers, sweeping off at a low angle, would accumulate forest duff and the rhododendrons would spring up on the branches almost in an epiphytic manner. Rhododendron tashiroi, a small azalea, was occasionally in flower, purple with a reddish blotch. A holly that is closely related to Ilex crenata occurred up to about 4,500 feet altitude. This is I. mutchagara, an evergreen species with

black fruit. Daphniphyllum macropodium, with red petioles, occurred in sunny localities reaching to 30 feet. The size of Clethra barbinervis was astonishing, for some of the clumps reached 30 feet or more in height.

Hana-no-ego (Flowering Swamp) is a subalpine sphagnum bog about 5,200 feet altitude. Here, Juniperus chinensis var. sargentii flourished in large pendulous clumps. This variety with its grayish, threadlike adult branchlets scarcely resembles the juvenile form so commonly grown in the United States. As we wandered around the soggy meadow, the following plants were noted: Buxus microphylla var. japonica, Eurya yakusimensis, Rhododendron yakusimanum, R. metternichii, and Viburnum urceolatum. Occasionally a plant of Pieris japonica grew around the drier perimeter of the swamp but no azaleas occurred here. It was interesting to note how well the plants grew in this cool, moist atmosphere and high water table, for every footprint left a reservoir of water.

Returning from Hana-no-ego, we passed a number of specimens of a Camellia called Camellia hayaoi. It had large, shiny, black fruits and according to my guide, small red flowers that only partly opened. It differs in other minor details from C. japonica and may be only a form of that species.

We concluded our collecting in the mountains, returned to Ambo by the narrow-gauge railroad, and proceeded around the southern coast to a town called Kurio. This region had been heavily felled for logs and was in a state of semi-devastation. It had been a privately owned forest and was in sharp contrast to the fine silvicultural practices of the imperial Japanese foresters. The logging road had been abandoned and camphor distillation and charcoal burning were removing the remainder of the large trees. In these hills, we found Lagerstroemia fauriei. This deciduous tree with brown and green flaky bark grows to 30 feet. The flowers are white. Only a few trees of this endemic species were noted; it was evident that it would soon be extinct in the wild. Acer rufinerve was widespread along the rocky streams, brilliant yellow in its fall color. The trunk of this maple is striped green and white.

We followed along the beaches of the southern part of the island where Canavalia lineata was rampant and covered the sand with bright yellow flowers and large hairy pods. Buddleia curviflora grew in sunny places along the beach road and had nodding spikes of purple flowers. The few streams had mostly dried up but among the rocks terrestrial orchids such as Calanthe, Dendrobium, and Goodyera occurred. Chrysanthemum indicum and C. japonense also flourished in the baked soil and bright sunlight and matted the ground with many white flowers having yellow centers.

The coast between Ambo and Miyanoura is exceedingly rocky and the huge stones sheltered several woody shrubs. The gnarled and twisted windforms sometimes were swept flat along the rocky surfaces. Raphiolepis umbellata, Quercus wrightii, and Rhododendron lateritium were among the plants found here. Two species of cinnamon, C. brevifolium and C. daphnoides, were especially of interest for both were shrubby plants, evergreen, and highly suited to the dry conditions of the coastal areas. We noted that these same species were sometimes used as ornamental plants by the islanders. They are not of value for spice.

Because the high seas prevented the return of the steamer, we returned once more to the Isso River area where additional collections were secured--mostly orchids, ferns, and herbaceous plants. Final air shipments of plants were made and on December 1, we were able to embark on the Chofukumaru for the short journey to Tanegashima. The islands are only about 12 miles apart.

Tanegashima (fig. 4) is a narrow island approximately 36 miles long and 8 miles wide. It is devoid of high mountains and largely given over to agricultural programs, particularly new crops. Because this island is among the southernmost territories of Japan certain subtropical and specialty crops probably can be grown here. At present, rice, sugarcane, and sweet potatoes are the principal crops. Certain areas, removed from forestry, have been planted to Vetiveria zizanioides from which a perfume base is derived. The success of these crops is largely due to the efforts of the Anno branch of the Kyushu Experiment Station which serves as a kind of plant introduction station for the island. American varieties of sugarcane have been tested here and found to be especially suited to the environment. Members of the staff of the Anno Experiment Station gave much of their time during our collecting both on Yakushima and Tanegashima.

There are two large experimental forests, Tachimoto and Furuta. Our first visit was to Tachimoto Forest in the southern part of the island. Although mostly planted to cryptomeria, a number of evergreen oaks have survived, Lithocarpus edulis being common. Cycads and epiphytic orchids grew on the trunks and horizontal branches of the trees. There were relatively few new woody plants here but Helicia cochinchinensis, a small tree, with evergreen foliage that thrived in dry soils, was noted. Dendropanax trifida occurred along the sides of the trails.

Along the coast, numerous colonies of Juniperus conferta spread prostrate along the sand dunes, the main stems flat and rooting to the sand while secondary branchlets stood upright. This juniper is an excellent plant for preventing dune erosion and has a wide range of heat and cold tolerance. In the town of Nishi-no-omote, Cinnamomum brevifolium grew along the dusty, dry road. We paused here long enough to collect its seed. Unfortunately seed of the cinnamon is highly perishable and only a few seeds germinated.

In Furuta National Forest, evergreen oaks were also plentiful. These were generally accompanied by the usual epiphytic orchids, climbing ferns, and cycads. Occasionally we noted Citrus tachibana growing in rocky, dried stream beds. The sour fruit was about the size of a small plum and was borne in profusion. Idesia polycarpa; Ilex hanceana, - a red-fruited holly with very small berries; Symplocos japonica, upright, about 8 feet tall with a habit suggesting a good hedge plant; and Eurya emarginata, dotted the open hillsides. E. emarginata, a camellia relative, grows in a broad spreading manner and will serve as a choice foundation plant. Elaeagnus crispa was especially common. Clematis crassifolia, an evergreen vine, laced the cryptomerias with large clusters of white flowers about 1 inch across.

Of the orchids, Phajus maculatus was the most striking. We came upon it while climbing up a shaded hillside. This terrestrial species first appeared to have small spots of sunlight flicking across the leaves but in reality this mirage was a multitude of large yellow variegations. The pattern was consistent among wild specimens and of a genetic nature. Later in our travels on Kyushu, we ran across P. maculatus var. minor, smaller in every detail, including the leaf spotting.

Winter storms dashing the surf high above the breakwater at Nishi-no-omote prevented our leaving Tanegashima until December 7 and on that date we returned to the island of Kyushu aboard the Chofukurmaru, forwarded our collections to Kurume, and traveled down to Hirakiki Mountain in Satsuma. On the slopes of this cone, the vegetation was greatly disturbed by charcoal collectors. This whole area was generally poor in agricultural land. About half way to the top of the cone, several terrestrial orchids were gathered, Goodyera maximowicziana, characterized by pink-striped velvety leaves was the most unusual. Ardisia japonica, with solitary red berries grew along the roadside. This is the hardiest species of Ardisia and was used in the gardens of Kyoto as a ground cover.

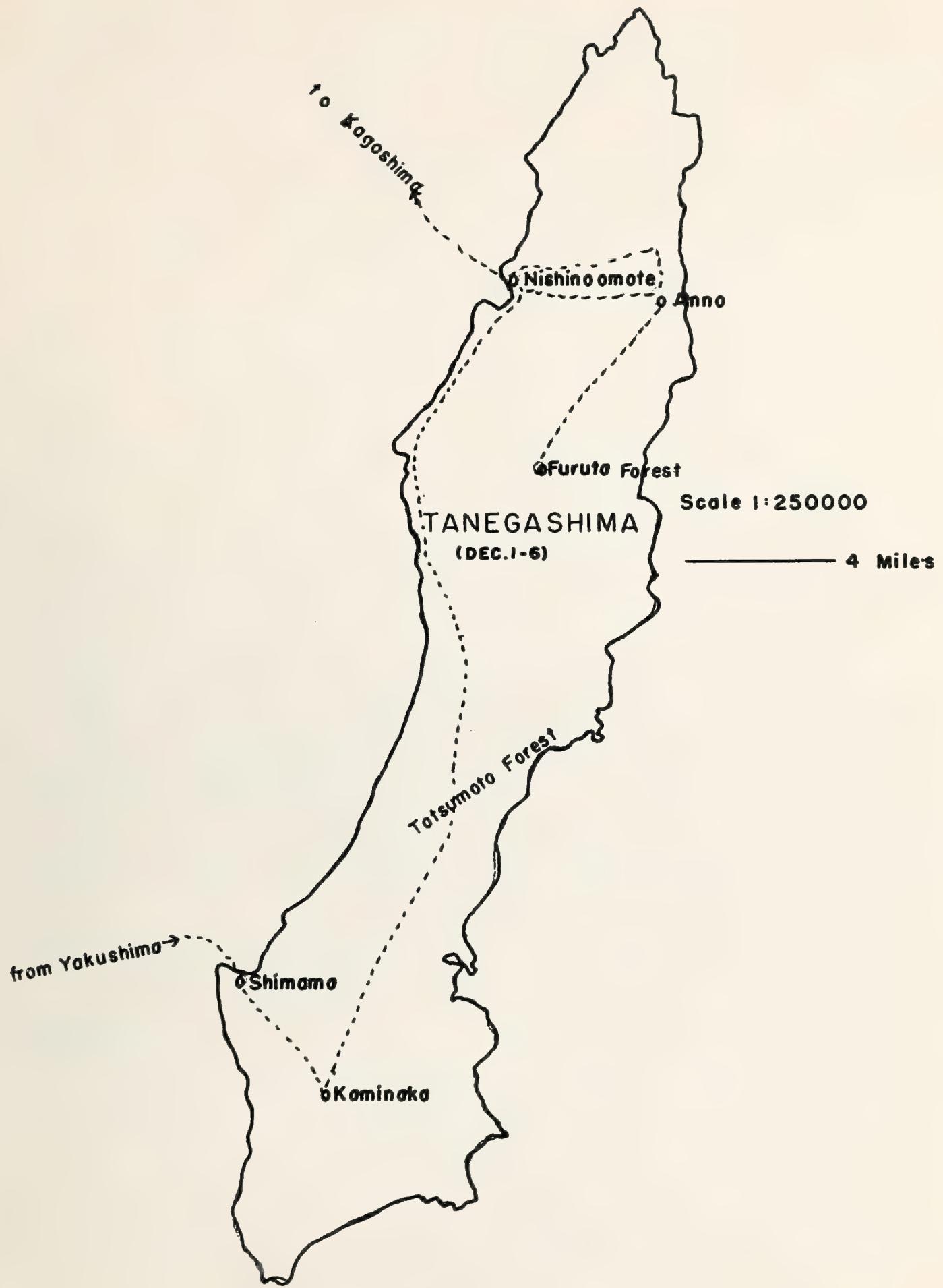


FIGURE 4.--Map of Tanegashima, showing route of travel on the island.

We finally returned to Kurume, Kyushu, to visit local nurseries and the experimental station. The Kurume Horticultural Field Station is a leading institution in Japan, devoted to vegetable crops, small fruits, and ornamentals. Here, one can see in proper scale, small hills transformed into a likeness of the mountains of Kyushu with the different azalea ecotypes planted on the proper mountains, Kirishima, Unzen, Sakurajima, and Aso. Elevations are marked and the whole display carefully executed. Here too, the old azalea varieties of Kurume have been assembled and the newest varieties have been added. A collection of Glenn Dale varieties has been included and recently several native American species introduced. The most recent race of azaleas to be noted was the so-called Hirado azaleas. These are large-flowered clones that have existed for possibly 500 years on the small island of Hirado, near Nagasaki. Some 200 clones have been brought to the Kurume Field Station for use in breeding and dissemination to the Japanese nursery trade.

Our arrival in Kurume was accompanied by cold weather and a light snowfall making living in poorly heated Japanese quarters rather gloomy. It also heralded the end of our collecting trip. On December 10 we returned to Tokyo with our collections of seeds, plants, and herbarium specimens.

Survey of Chrysanthemum Nurseries and Other Plant Culture Centers

(Nov. 4-15; Dec. 12-15)

Since the chrysanthemum is the flower of the Imperial family of Japan, considerable importance is attached to its culture, development, and display. Large exhibitions of chrysanthemums are given in the major cities, such as at Shinjuku Gardens, Tokyo; Hirakata Park, Hirakata; Shizuoka; Mishima; Osaka-Kobe; Akashi; Okayama; and Fukuyama.

For display purposes each show employs its own staff of cultural experts and breeders. Often the varieties raised for a particular exhibit are not released for general distribution and this results in types peculiar to that show. Thus, to see all of the kinds of chrysanthemums, ultimately every show should be observed.

In addition to these public shows, several commercial breeders of chrysanthemums also exhibit. Of these, I visited the following:

Bisho-en, Motomachi, Matsumoto City
Seiko-en, Kanemaru, Hiroshima-Ken
Shuho-en, Kanemaru, Hiroshima-Ken

Taikai-en, Kusanagi, Ki-machi
Taiho-en, Hirakata City

At each of these nurseries, representative varieties were presented for introduction into the United States. All of the varieties have been placed in quarantine at Glenn Dale, Md., to be indexed for possible virus diseases before distribution.

Other plant-growing areas visited during the tour were at Angyo, Saitama-ken. Through the efforts of Mr. Nakada, Koju-en, Angyo, Kawaguchi, Saitama, a large collection of rare cultivated forms of woody plants were assembled. Of these the following may be noted: A weeping form of Zelkova serrata, a variegated form of Z. serrata, two ornamental varieties of Camellia sinensis, a white fruited form of Ilex serrata, a variegated form of Ilex crenata, dwarf and yellow-tipped forms of Cryptomeria japonica, and a compact, dwarf type of Juniperus chinensis.

In addition to the ornamental collections, the wild form of Pyrus serotina was located. This species is almost extinct in Japan owing to its having been cut for charcoal. Near Mishima a wild tree was located and all fruits gathered for use by pear

research workers in the United States. For use by crops research workers in the United States varieties of tea (Camellia sinensis) and types of sugarcane (Saccharum spontaneum) were also collected. From the National Experiment Station at Hiratsuka, persimmon varieties were obtained and through the Special Products Section, Ministry of Agriculture, leading varieties of the salad plant, udo, were introduced.

ENUMERATION OF COLLECTIONS

The following list of collections is arranged by Plant Introduction numbers assigned. There is a brief generic index to the P.I. numbers. Scientific and/or varietal names and field numbers, together with brief descriptions from the field notes, are included. Identification of the plants is tentative but herbarium specimens of most of the wild collections are held by field number in the National Arboretum Herbarium, Plant Industry Station, Beltsville, Md. The nomenclature is based on Honda's "Nomina Plantarum Japonicarum" and Makino's "Flora of Japan."

An enumeration of plants and seeds collected during the plant exploration to Japan, September 30 to December 23, 1956. These are arranged by P.I. numbers, followed by a brief description from the original field notes. Numbers following names are field numbers.

P.I. 234948-949; 235127-143. Seeds and plants collected in the vicinity of Shibu Onsen, Yatsugatake Range, Nagano Prefecture, Oct. 8-12, 1956.

234948 *ILEX RUGOSA* 463 In subalpine conifer forest, 6,660 feet. Yatsugatake Mts., Nagano Pref. Female plants and cuttings.

234949 *RHODODENDRON JAPONICUM* 451 In open swampy meadow, 5,100 feet. Yatsugatake Mts., Nagano Pref. (July-flowering form)

235127 *BERCHEMIA RACEMOSA* 466 Open fields below Shibuyu Onsen, 4,500 feet. Yatsugatake Mts., Nagano Pref. A deciduous climber with attractive reddish-black fruits.

235128 *BETULA PLATYPHYLLA* var. *JAPONICA* 454 Open fields above Shibuyu Onsen, 5,100 feet. Yatsugatake Mts., Nagano Pref. Distinct birch with white bark.

235129 *ILEX GENICULATA* 453 Open fields above Shibuyu Onsen, 5,100 feet. Yatsugatake Mts., Nagano Pref. A rare species with a profusion of bright red fruits on long stalks. It is a deciduous holly.

235130 *CHAMAECYPARIS OBTUSA* 457 Open fields above Shibuyu Onsen, 5,250 feet. Yatsugatake Mts., Nagano Pref.

235131 *CLETHRA BARBINERVIS* 460 Growing on rocky hillside, 5,400 feet. Yatsugatake Mts., Nagano Pref. Deciduous shrub, stiffly erect, with white flowers in terminal panicles.

235132 *CONVALLARIA KEISKEI* 464 Open fields above Shibuyu Onsen, 5,400 feet. Yatsugatake Mts., Nagano Pref. This is the Japanese lily-of-the-valley. The flowers are white, late May to June; fruit is orange to red.

235133 *HEMEROCALLIS THUNBERGII* 458 Open fields above Shibuyu Onsen, 5,550 feet. Yatsugatake Mts., Nagano Pref. Flowers lemon yellow, faintly fragrant and bloom in July.

235134 *HYDRANGEA PANICULATA* 468 Sunny places near Shibuyu Onsen, 5,400 feet, Yatsugatake Mts., Nagano Pref.

235135 *ILEX RUGOSA* 463 (same as 234948 but seed collected from plants under 234948)

235136 *LIGUSTRUM CILIATUM* 461 Above Shibuyu Onsen, rocky, semi-shaded areas at edges of fields, 5,640 feet. Yatsugatake Mts., Nagano Pref. Broad shrub up to 3 feet high and spreading. The leaves turn dull purple in October.

235137 *LINDERA OBTUSILOBA* 469 Along roadside below Shibuyu Onsen, 4,500 feet. Yatsugatake Mts. Nagano Pref. A deciduous shrub with yellow flowers before the leaves. Fruit at first red then shining black.

235138 *RHODODENDRON JAPONICUM* 456 Open fields above Shibuyu Onsen, 5,400 feet. Yatsugatake Mts., Nagano Pref. (Plants with normal deciduous habit.)

235139 *RHODODENDRON JAPONICUM* 459 Open fields above Shibuyu Onsen, 5,610 feet. Yatsugatake Mts., Nagano Pref. (Plants which held leaves green late in autumn, typical of late-blooming type)

235140 *ROSA MULTIFLORA* 465 Below Shibuyu Onsen, open fields, 4,500 feet. Yatsugatake Mts., Nagano Pref. The highest locality for this species in these mountains.

235141 *SCABIOSA JAPONICA* 452 Open meadows above Shibuyu Onsen, 5,610 feet. Yatsugatake Mts. Nagano Pref. Biennial, with flowers pale to dark purple, sometimes pink or white, 2 inches across.

235142 *SCHISANDRA CHINENSIS* 467 Along sunny road below Shibuyu Onsen, 4,500 feet. Yatsugatake Mts., Nagano Pref. Vine, flowers whitish in June, berries orange-red in October.

235143 *SORBUS RUFO-FERRUGINEA* 462 At edge of fields, usually as understory of other trees, above Shibuyu Onsen, 5,550 feet. Yatsugatake Mts., Nagano Pref. Small tree with bright red foliage in the fall and fruit also bright red. Distinguished by reddish brown down on underside of leaves from *S. com-*
mixta.

235247-235272 Plants and cuttings collected at Kotohira, Muroto, and Ashizuri, Shikoku, Japan October 14 - 22, 1956.

235247 *ARISAEMA RINGENS* 492 Limestone ravines, at Iwogi City, Kochi-ken.

235248 *ARISAEMA TOSAENSE* 517 On Zozusan Mt., Kotahira, Kagawa-ken.

235249 *CAMELLIA SASANQUA* 509 Between Shimizu and Nakamura, Tosa-ken. Wild plant with small leaves and narrow petals.

235250-256 *C. SASANQUA* In shrine garden, Zozusan, Kotahira, Kagawa-ken.

235250 large, single white - 510
235251 large, semi-dble, white - 511
235252 large, single, dark red - 512
235253 large, single, pink - 513
235254 small, single, dark pink - 514

235255 medium, single, pink and white - 515
235256 medium, anemone, pink - 516

235257 *CHRYSANTHEMUM SHIWOGIKU* 484 Along sandy beach, Muroto-zaki, Kochi-ken. A prostrate plant, some branches ascending, leaves thick, pubescent beneath; flowers in December, yellow.

235258 *CORYLOPSIS SPICATA* 494 Endemic to Kochi-ken, occurring on shale, Kochi-ken. Deciduous shrub, to 6 feet tall; leaves broadly ovate; flowers bright yellow, before the leaves.

235259 *DEBREGEASIA EDULIS* 493 In limestone ravine, Iwogi, Kochi-ken. A rare shrub 9 feet tall, with handsome linear leaves and bright yellow fruit. Probably hardy in north.

235260 *DIPLOZIUM LANCEUM* 488 Muroto-zaki, in broadleaved woods above sea-coast, Kochi-ken. An evergreen fern, leaves longly lanceolate, entire.

235261 *FICUS PUMILA* 473 On tree trunks, broadleaved woods, Muroto-zaki, Kochi-ken. An evergreen vine, leaves entire or 3 to 5 lobed, 1 cm. long.

235262 *GLOCHIDION SP.* 486 From sea-coast to 300 feet, in broadleaved forest, Mutoto-zaki, Kochi-ken. A small deciduous, spiny shrub, but partly evergreen according to locality, leaves distinctly obovate; flowers small, yellow, in May. Not in cultivation.

235263 *INDIGOFERA PSEUDOTINCTORIA* 480 Growing on sandy beaches, Muroto-zaki, Kochi-ken. A prostrate, ground-covering species attaining 3 feet spread; flowers purple, pods about 1 inch long.

235264 *IRIS JAPONICA* 521 In garden, Toraya Inn, Kotohira, Kagawa-ken. A garden variety with green and white striped leaves; flowers pale blue with yellow markings, in May. Said to be sterile.

235265 *LACTUCA KEISKEANA* 483 On sandy beaches and on rocks, Muroto-zaki, Kochi-ken. Herbaceous evergreen plant, prostrate; flowers bright yellow.

235266 *OSMUNDA BROMELIIFOLIA* 490 In limestone ravines, damp shady locality, Iwoji, Kochi-ken. Evergreen ferns, with pinnate fronds 4 feet long.

235267 *PODOCARPUS NAGI* 474 In broadleaved woods above seacoast, Murotozaki, Kochi-ken. A tall tree, evergreen with shining dark-green leaves; seed round purplish when ripe. In cultivation.

235268 *PRUNUS ZIPPELIANA* 482 In broadleaved woods above seacoast, Murotozaki, Kochi-ken. An evergreen cherry, 25 feet high, with large ovate leaves; flowers in racemes, greenish; fruit black. Not in cultivation.

235269 *PSILOTUM NUDUM* 472 In humus along path above seacoast, Murotozaki, Kochi-ken. A leafless plant, stems green, about 4 inches tall.

235270 *PTERIS RETICULATA VAR. ALBO-LINEATA* 491 In limestone ravines, Iwogi, Kochi-ken. Small fern, palmately divided fronds with white markings along midrib.

235271 PYRROSA LINGUA 489 Found on walls of rocky limestone ravines, Iwogi and Murotozaki, Kochi-ken. An evergreen fern, leaves small, longly lanceolate.

235272 RUMOHRA ARISTATA 477 In shaded, damp broadleaved woods, Murotozaki, Kochi-ken. Evergreen fern, frond thick shiny aristate, up to 2 feet long.

235293-235303 Plants purchased from Shinto-en Nursery, Ise City, Mie Pref., Japan.
PSILOTUM NUDUM
 235293 Bunruisan
 235294 Fudechiku
 235295 Higebo
 235296 HowoOchirimen
 235297 Kishu-ku
 235298 Kintsukumo
 235299 Nodichiku
 235300 Orizuru
 235301 Seirukaku
 235302 Toubaichiku

235303 EXCOECARIA CRENULATA - tropical shrub with opposite leaves, dark red beneath.

235304-235334 - Plants and cuttings from Ashizuri, on Shikoku and from locations on Kii Peninsula. Oct. 14-22; 24-31, 1956.

235304 *ALSOPHILA HANCOCKII* 500 In damp woods near Cape Ashizuri, Nakamura, Shikoku. Evergreen fern with finely divided fronds.

235305 *ANGIOPTERIS SUBOPPOSITIFOLIA* 507 In damp woods, Ashizuri-zaki, Nakamura, Shikoku. Large fern evergreen, frond supra-decompound, 9 feet long.

235306 *PEUCEDANUM JAPONICUM* 502 On sea-cliff, in full sun. Ashizuri-zaki. Perennial, leaves ternately compound, to 18 inches; flowers white in compound head. (Frequently used for flower arrangements.)

235307 *ARDISIA SIEBOLDII* 506 In deep shady forest glen, Ashizuri-zaki. Shrub, evergreen, to 3 feet, leaves elliptic serrate; flowers white, fruit red.

235308 *ARDISIA VILLOSA* 536 In damp woods of Shrine Forest, Shirahama, Wakayama-ken. Small prostrate evergreen species, stem rooting, leaves ovate, serrate, dark green. Possibly a good ground cover. Not in cultivation.

235309 *ARISAEMA SP.* 560 In damp woods, along stream bed, Gegu Shrine Forest, Ise, City, Mie Prefecture.

235310 *ASARUM SP.* 542 Along mountain path, Nachi-san, Kii, Wakayama-ken. Herbaceous perennial, leaves green, heart shaped.

235311 *ASARUM SP.* 557 In damp woods, Gegu Shrine Forest, Ise City, Mie Pref. Herbaceous perennial, leaves longly ovate, cordate, variegated gray green.

235312 *ASPLENIUM WRIGHTII* 540 In damp woods of mountain forest, Nachi-san, Kii, Wakayama-ken. Large evergreen fern; pinnate, dark shining leaves.

235313 BAUHINIA JAPONICA 523 Koshima Island, Tanabe Bay, Kii, Wakayama. Liana, deciduous, leaves ovate, sometimes deeply lobed, flowers not seen. Northern limit. Not in cultivation.

235314 CAMELLIA JAPONICA 534 In Kyoto Univ. Exp. Forest Oshima Island, Kushimoto, Wakayama. Shiro-tama - early variety, flowers large, double, pale pink, cup shaped.

235315 CAMELLIA SP. 533 In Kyoto Univ. Exp. Forest, Oshima Island, Kushimoto, Wakayama. Characterized by dark shiny, narrowly pointed leaves; flowers white, small, single.

235316 CHRYSANTHEMUM JAPONENSE 505 Above sea-cliff, in full sun Ashizuri-zaki. Small leaved species; flowers white with yellow center, December. Collected as variety Ashizuriense.

235317 DAMNACANTHUS MACROPHYLLUS var. GIGANTEUS 522 Damp woods, Gegu Shrine Forest, Ise City, Mie Pref. Small evergreen shrub, leaves opposite small spines; fruit solitary, red. Quite different from D. indicus. Not in cultivation.

235318 DICRANOPTERIS DICHOTOMA 525 In damp forest, Shirohama, Kii, Wakayama. Evergreen fern, fronds linear, deeply lobed; rhizome stout, ramifying.

235319 DISTYLIUM RACEMOSUM 530 Oshima Island, near Kushimoto, Wakayama-ken. Evergreen tree, used extensively on Oshima for hedges and windbreaks because of upright stiff habit.

235320 EUCHRESTA JAPONICA 541 In cryptomeria forest, Nachi-san, Kii, Wakayama-ken. Small evergreen shrub with leaves trifoliate, leaflet ovate; pod dark purple, one-seeded.

235321 HEMEROCALLIS AURANTIACA var. LITTOREA 504 On face of sea-cliffs, Asbizuri-zaki. Flowers orange-red, in bloom in late October.

235322 HUGERIA JAPONICA 543 Along mountain path, Nachi-san, Kii, Wakayama Pref. Small evergreen shrub, stems and branchlets green, leaves ovate-lanceolate, finely serrate; flowers white, berries red.

235323 HYMENOPHYLLUM BARBATUM 538 Along mountain path, Nachi-san, Kii, Wakayama Pref. Small evergreen fern growing on damp rocky walls of ravines, fronds very thin, filmy, margin of frond serrate.

235324 HYMENOPHYLLUM INTEGRUM 539 In damp woods of mountain forest on rocky walls of ravines, Nachi-san, Kii, Wakayama Pref.

235325 LIPARIS NERVOSA 550 Forest of Gegu Shrine, Ise City, Mie Pref. Terrestrial orchid, leaves ovate; flowers in a spike, greenish, small.

235326 PELLIONIA MINIMA 537 In damp woods of Cryptomeria forest, Nachi-san Kii, Wakayama Pref. Prostrate evergreen plant with purplish stems, shiny ovate leaves. Not in cultivation.

235327 RHODODENDRON SERPYLLIFOLIUM 544 Along mountain path, Nachi-san Kii, Wakayama. Small evergreen species, leaves minute; flowers 3/4 inch across, white.

235328 SYMPLOCOS GLAUCA 526 In woods above Shrine Forest, Shirohama, Kii, Wakayama. Evergreen tree, leaves lanceolate, entire.

235329 SYMPLOCOS PRUNIFOLIA 551 Forest of Gegu Shrine, Ise City, Mie Pref. Evergreen tree to 30 feet, leaves narrow elliptic; flowers not seen, fruit black. Not in cultivation.

235330 SYMPLOCOS THEOPHRASTAEFOLIA 553 Forest of Gegu Shrine, Ise City, Mie Pref. Large evergreen tree to 10 meters, leaves, large elliptic, coarsely serrate, dark green. One can mistake this for Ilex latifolia.

235331 TRACHELOSPERMUM ASIATICUM var. OBLANCEOLATUM 528 Oshima Island, near Kushimoto City, Wakayama, Pref. Small evergreen vine, this variety characterized by oblanceolate leaves.

235332 TRICYRTIS FLAVA, 558 Along stream bed, woods of Gegu Shrine, Ise City, Mie Pref. Herbaceous plant, evergreen, leaves lanceolate with dark green spots; flowers yellow.

235333 TRICYRTIS MACROPODA 559 Along stream bed, woods of Gegu Shrine, Ise City, Mie Pref. Herbaceous plant, evergreen, leaves lanceolate; flowers white with purple spots.

235334 ZOYSIA JAPONICA 503 Along sea cliffs in full sun, Ashizuri-zaki. A small-leaved form.

235420-235437: 235495-235520 Seeds collected in southern Japan, including Shikoku and Kii Peninsula, October 14-31, 1956.

235420 ARISAEMA SHIKOKIANUM 518 In woods at Zetzusan, Kotohira, Kagawa-ken, Shikoku.

235421 ARISAEMA TOSAENSE 517 In woods at Zetzusan, Kotohira, Kagawa-ken, Shikoku.

235423 CORYLOPSIS SPICATA 494 On serpentine hill, Kochi, Kochi-ken, Shikoku. Deciduous shrub, with bright yellow flowers before the leaves.

235424 DAPHNIPHYLLUM GLAUCESCENS 475 Murotozaki, Kochi-ken, Shikoku. An evergreen tree to 30 feet, leaves lanceolate, glaucous beneath; flowers unisexual, greenish, fruit black when ripe.

235425 EURYA EMARGINATA 485 Along beach areas, Murotozaki, Kochi-ken, Shikoku. An evergreen shrub, dense and spreading, Leaves elliptic, emarginate; flowers pale yellow hanging beneath the leaves in profusion, fruit black; plants dioecious.

235426 ILEX SERRATA VAR. SIEBOLDII 495 On serpentine hills, above Kochi City, Kochi-ken. A deciduous holly with rather small, red fruit in a cyme, 4-seeded.

235427 INDIGOFERA PSEUDOTINCTORIA 480 Along sea-coast in sand, Murotozaki, Kochi-ken, Shikoku. A prostrate shrub, deciduous, flowers purple-pink, stems erect to decumbent, some specimens attaining 3 feet across. Good ground cover.

235428 LYSIMACHIA SIKOKIANA 471 Murotozaki, in broadleaved evergreen forest, Kochi-ken. Subshrub, about 15 inches tall; flowers axillary, yellow, hanging; followed by whitish fruits on stems 1 to 2 inches long.

235429 MAESA JAPONICA 470 In broadleaved evergreen forest, Murotozaki, Kochi-ken, Shikoku. Evergreen shrub to 3 feet; flowers inconspicuous, fruit small, yellowish when ripe.

235430 MELIOSMA RIGIDA 476 Murotazaki, in broadleaved, evergreen forest, Kochi-ken, Shikoku. An evergreen tree with broad oblanceolate leaves, shining rugose above; flowers small, fruit round, yellow-red. Rare in cultivation.

235431 NEOLITSEA SP. 519 On Zozusan, Kotohira, Shikoku. An evergreen tree to 50 feet or more, related to cinnamomum, leaves elliptic; flowers yellowish in dense clusters along branches, fruit bright red, 2 to 3 in a cluster.

235432 PODOCARPUS NAGI 474 In broadleaved, evergreen forest, Murotozaki, Kochi-ken, Shikoku. Evergreen tree, leaves ovate, lanceolate, shining, dark green; dioecious, seeds round, purple when ripe.

235433 QUERCUS WRIGHTII 479 Along seacoast, Murotozaki, Kochi-ken, Shikoku. An evergreen tree, shrub-like along seacoast, leaves ovate, minutely serrate, pubescent beneath.

235434 RAPHIOLEPIS UMBELLATA var. MERTENSII 487 Along seacoast, Murotozaki, Kochi-ken, Shikoku. Dense evergreen shrub, leaves roundish, thick; flowers white in May; fruit purple.

235435 ROSA WICHURIANA var. POTERIIFOLIA 478 Along seacoast, in sand, Murotozaki, Kochi-ken, Shikoku. A prostrate plant with small, shiny, leaves; flowers white 1-1/2 inches across, fruit red, ovoid. Good ground covering form, small leaves and restricted habit.

235436 TERNSTROEMIA MOKOF 520 In garden of Toraya Inn, Kotohira, Shikoku. Small evergreen tree, leaves oblanceolate, dark green; dioecious, flowers whitish, fruit orange with red seeds.

235437 VIBURNUM EROSUM 496 On serpentine hills, above Kochi City, Kochi-ken, Shikoku. A deciduous shrub, 8 feet tall; fruit in loose cyme, red.

235495-235520 Seeds collected in southern Japan, principally Shikoku and Kii Peninsula, October 14-31, 1956.

235495 ACTINODAPHNE LANCIFOLIA 556 Forest of Gegu Shrine, Ise City, Mie Pref. Honshu. An evergreen tree with handsome flaky, brown/white bark; leaves ovate; fruit purple-black.

235496 ALPINIA CHINENSIS 531 Kyoto Univ. Experimental Forest, Oshima Island, Wakayama Pref. Probably naturalized.

235497 ASPARAGUS COCHINCHINENSIS 497 Along seacoast, Murotozaki, Kochi-ken, Shikoku. Perennial, scandant plant, leaves bright green, linear; fruit red.

235498 CALLICARPA JAPONICA var. LUXURIANS 508 Ashizurizaki, Shikoku. A shrub to 15 feet; flowers pale purple, fruit deep purple in large clusters.

235499 *CALICARPA MOLLIS* 509 In damp woods of Shrine Forest, Shirohama, Wakayama-ken, Kii. A shrub to 15 feet, leaves densely pubescent; fruit purple, enclosed in enlarged calyx. Less attractive than 235498.

235500 *CAMELLIA OLEIFERA* 535 In Kyoto Univ. Experimental Forest, Oshima Island, Kushimoto, Wakayama-ken. Evergreen shrub, flowers white, single, rather small. Grown as a source of oil.

235501 *CASTANOPSIS CUSPIDATA* 555 Forest of Gegu Shrine, Ise City, Mie Pref. Tall evergreen tree, leaves narrow lanceolate, acorns small, black.

235502 *EURYA OCHNACEA* 545 Entrance to Kumano Shrine, Nachi-san, Wakayama Pref. Small evergreen tree or shrub, leaves ovate, entire; flowers white, berries black.

235503 *COCCULUS TRILOBUS* 522 Kashima Island, Tanabe, Wakayama Pref. A scandant vine, leaves round; fruit in large clusters, bright blue.

235504 *CRINUM ASIATICUM* var. *JAPONICUM* 529 Along roadside, Oshima Island, Kushimoto, Wakayama Pref. Flowers white, in large clusters, July-August.

235505 *DISTYLIUM RACEMOSUM* 530 Along roadside as hedge plant, Oshima Island, Kushimoto, Wakayama Pref. Evergreen tree, often grown as hedge or wind-break, leaves ovate, entire.

235506 *EUCHRESTA JAPONICA* 541 In forest at Nachi-san, Wakayama Pref. Small evergreen shrub, running habit, leaves tri-foliate, dark, shiny green; pod one-seeded, dark purple.

235507 *HEMEROCALLIS AURANTIACA* var. *LITTOREA* 504 On face of sea cliff, in full sun, Ashizurizaki, Shikoku. Flowers orange-red in late October.

235508 *ILEX INTEGRA* 501 Ashizurizaki, National Forest Ashizuri, Shikoku. Evergreen tree to 40 feet, leaves entire; fruit usually in 2, red, ovoid, largest of any holly.

235509 *ILEX SERRATA* var. *SIEBOLDII* 563 At Shingu City, Mie Pref. Deciduous holly; fruit bright red on short stems, prodigious bearing habit.

235510 *LASIANTHUS JAPONICUS* 498 Nakamura City, Ashizurizaki, Shikoku. Evergreen shrub, flowers white axillary, fruit brilliant blue in October.

235511 *LASIANTHUS SATSUMENSIS* 499 Nakamura City, Ashizurizaki, Shikoku. Similar to 23510 but differing in that undersides of leaves are glaucus.

235512 *LASIANTHUS SATSUMENSIS* 548 Nachi-san, Wakayama Pref. Same as 235511.

235513 *PHOTINIA VILLOSA* var. *LAEVIS* 565 Shingu City, Mie Pref. Handsome deciduous shrub, fruit red, oblong. Good red fall color to foliage.

235514 *QUERCUS GLAUCA* 554 Forest of Gegu Shrine, Ise City, Mie Pref. Tall evergreen oak, leaves ovate, coarsely serrate, shiny above, glaucus beneath.

235515 *SCIADOPITYS VERTICILLATA* 562 In forest of Gegu Shrine, Ise City, Mie Pref. Tall conifer to 100 feet; typical for the species.

235516 *TSUGA SIEBOLDII* 561 In forest of Gegu Shrine, Ise City, Mie Pref. A handsome hemlock, characterized by having entire leaf margins and notched apex.

235517 *TUBOCAPSICUM ANOMALUM* 524 In forest of Shrine, Shirohama, Wakayama Pref. A subshrub, stems green; fruit bright orange, hanging on stalks 1 to 2 inches long.

235518 *VIBURNUM JAPONICUM* 532 Kyoto Univ. Experimental Forest, Oshima Island, Wakayama Pref. An evergreen species with dense cymes of red fruit. In cultivation to some extent.

235519 UNDET. (LEGUME) 549 In cryptomeria forest, Nachi-san, Wakayama Pref. Small vine, leaves trifoliate; pods 2 inches long bright purple and quite ornamental.

235520 UNDET (MYRTACÉAE) 566 In Botanic Garden, Gegu Shrine, Ise City, Mie Pref. An evergreen shrub to 8 feet, leaves opposite, entire; fruit black.

235567-575; 235581-584 - Plants and seeds collected on tour of southern Honshu, Nov. 5-17, 1956

235567 *ASARUM SP.* 575 Rokko-san Alpine Park, Kobe, Japan. Small plant growing wild along bank, leaves green faintly mottled.

235568 *CAMELLIA JAPONICA* 574 Rokko-san, Kobe. A late flowering variety growing along mountain road. Cultivated; flowers around June 15 to 20, Single, red flowers.

235569-573 *CAMELLIA SINENSIS* National Tea Experiment Station, Kanoya, Shizuoka Pref.

235569 Yabukita 567	235572 Y-2 570
235570 Tama midori 568	235573 Z-1 571
235571 Beni-homare 569	

235574 *ILEX MUTCAGARA* 578 Kyoto Univ. Botanic Garden, Kyoto. An evergreen holly, 18 feet tall; fruit black. Should be hardy in Maryland.

235575 *PYRUS SEROTINA* 579 Kyoto Univ. Botanic Garden, Kyoto. Scions of true wild species which is almost extinct in Japan.

235581 *CORNUS SP.* 573 In Korakuen Park, Okayama City. Small tree with profuse orange-red fruits, about 1/2 inch long, fleshy; possibly of Chinese origin.

235582 *DENDROBANAX TRIFIDA* 572 Near Okayama City. A handsome small evergreen tree with leaves entire or divided 3 to 5. Should be especially suited for shady locations. Not in cultivation.

235583 *ILEX MUTCAGARA* (see 235574) 578 Seed.

235584 *IRIS KAEMPFERI* 576 Seiko-en Nursery, Kanemaru, Hiroshima Pref. Hand-pollinated seed from choice garden hybrids of Kumamoto strain.

235615-630 *CHRYSANTHEMUM* Varieties Mr. N. Koido Bisho-en Nursery, Moto-machi, Matsumoto

235615 Beni-botan - purplish red
235616 Dai-higyo - scarlet red
235617 Dai-kin-ryu - yellow
235618 Haku-sei - white
235619 Hosan-no-kagayaki - yellow
235620 Kagero - red
235621 Kogetsu - yellow
235622 Koshin - deep red
235623 Mitsu-zuki - yellow
235624 Otome-no-hikari - pink
235625 Ryo-hu - white
235626 Sei-ryu - yellow
235627 Sei-un - white
235628 Shinano-no-homare - yellow
235629 Shin-to - yellow
235630 Ten-kei - pink

235631-632 HIBISCUS MUTABILIS From Mr. K. Suzuki, 2222 Tomiuko-machi, Kanazawa, Yokohama.

235631 Double red flowers - 582
235632 Double white flowers - 583

235633 CARPINUS LAXIFLORUS 580 Kanokawa Pass, between Kinomoto and Yamato, Kii. A deciduous tree to 40 feet, smooth gray bark, leaves small; fruit in loose raceme. Handsome tree.

235634 PYRUS SEROTINA 584 Wild, near Tomiuska, Yokohama, Japan. Wild pear almost extinct in Japan.

235635 STAUNTONIA HEXAPHYLLA 581 Near Angyo, Saitama Pref. A deciduous or semi-evergreen vine, leaves 6-parted, fruit large greenish; seeds black. Rare vine, hardy at Glenn Dale, Maryland.

235737-748 Plants collected on Yaku and Tanega Islands, Nov. 16-Dec. 10, 1956.

235737-744 ASARUM SP. In woods along Miyanoura River, Yakushima.

235737-625 Leaves large cordate, without variegation
235738-626 Leaves large cordate, acutely pointed, dark green
235739-627 Leaves large, cordate, variegated
235740-628 Leaves medium, cordate, slight variegations, dark green
235741-629 Leaves large, basal lobes elongated, variegated
235742-630 Leaves very large, cordate, dark green
235743-632 Leaves large, cordate, more or less triangular, variegated
235744-633 Leaves dark green, faint variegations

235745 ASPLENIUM SP. 635 Along shady banks, Miyanoura River, Manno Nat. Forest, Yakushima. Small evergreen fern, fronds narrow lanceolate, bipinnate.

235746 CALANTHE SP. 591 Isso River, Yakushima. A terrestrial orchid, along rocky ravines, leaves large, elliptic.

235747 CHEIROPLEURIA BICUSPIS 590 Isso River, Yakushima. A small evergreen fern found in rocky glen, dense shade; sterile leaves broadly lanceolate, fertile ones narrow.

235748 CLEMATIS SP 598 Along sea-road, Tomaiko, Yakushima. Small vine, with handsome silvery markings at center of leaves, flowers not seen.

235749 DENDROBIUM MONILE 644 Along Miyanoura River, Manno Nat. Forest, Yakushima. Stem fleshy, about 10 inches long, leaves lanceolate; flowers yellow or pink.

235750 EUGENIA JAMBOS 592 Nagata River, Yakushima. Evergreen tree, leaves opposite, fruit black, edible.

235751 GOODYERA MAXIMOWICZIANA 611 Isso River, Yakushima. Terrestrial orchid, leaves with broad pale stripe down center; flowers white, in short spike.

235752 GOODYERA SCHLECHTENDALIANA 606 Isso River, Yakushima. Terrestrial orchid, leaves variegated; flowers white in short spike.

235753 GOODYERA SP 610 Isso River, Yakushima. Terrestrial orchid, leaves not marked; flowers white.

235754 HEMEROCALLIS MINOR 618 Growing in garden of small inn, Miyanoura, Yakushima. Dwarf species, flowers orange-yellow on short stalks.

235755 LIPARIS NERVOSA 617 Isso River, Shirakawa Nat. Forest, Yakushima. Terrestrial orchid, leaves ovate; flowers greenish.

235756 LIPARIS NERVOSA 636 Miyanoura River, Manno Nat. Forest, Yakushima (see 235755).

235757 PSILOTUM NUDUM 641 On tree trunks, Miyanoura River, Yakushima. Typical wild type.

235758 RHODODENDRON INDICUM 645 Upper reaches, Miyanoura River, Manno Nat. Forest, Yakushima. Plants which were in full bloom 11/23/56.

235759 SAGENIA SP. 632 Miyanoura River, Manno Nat. Forest, Yakushima. Evergreen fern, leaves linear, strap-like, very long.

235760 SELAGINELLA UNcinata 602 Isso River, Yakushima. In damp rocky ravines, species with flat branchlets, broad and rather wavy.

235761 TAXILLUS SP. 609 On Isso River, Yakushima. Shrubby or scandant plant, evergreen with brown tomentum on leaves and stems. Parasitic on Elaeagnus.

235762 UNDET. (ORCHID) 638 Miyanoura River, Manno Nat. Forest, Yakushima. Epiphytic orchid, small dark green leaves, small ovoid pseudobulbs.

235763 UNDET. (ORCHID) 643 Miyanoura River, Manno Nat. Forest, Yakushima. Epiphyte, pseudobulbs ovate, leaves lanceolate; flowers greenish.

235764 UNDET. (ORCHID) 634 Miyanoura River, Manno Nat. Forest, Yakushima. Small epiphyte, ovoid pseudobulbs; flowers yellow-brown.

235765 UNDET. (ORCHID) 616 Isso River, Shirakawa Nat. Forest. Terrestrial, large leaves; flowers unknown. Possible Calanthe.

235766 UNDET. (ORCHID) 640 Miyanoura River, Manno Nat. Forest. Yakushima. Epiphyte, stems long, bulbless, leaves rather lanceolate.

235767 UNDET. (ORCHID) 612 Isso River, Yakushima. Terrestrial, leaves broad ovate, veins distinct, flowers yellow 1 inch, long raceme. Probably a Calanthe.

235768 UNDET. (RUBIACEAE) 631 Miyanoura River, Manno Nat. Forest, Yakushima. Subshrub, leaves opposite with stipules, flowers terminal, white fragrant.

235769 NEOPHOENICIA SP 639 Miyanoura River, Manno Nat. Forest, Yakushima. Epiphyte, leaves thick, heeled, bulbless.

235770 NEOPHOENICIA SP 642 Miyanoura River, Manno Nat. Forest, Yakushima. Epiphyte, leaves lanceolate; flowers in short spike, yellow.

235771 AINSLIAEA SP. 613 On rocks, Isso River, Yakushima. Herbaceous, about 3 inches high; flowers in spike, pale pink, fragrant.

235772 POLYPODIUM SP. 614 On rocks, Isso River, Yakushima, small fern, narrow lanceolate frond, rounded at apex.

235773-794 Plants collected on Yaku and Tanega Islands, Japan. Nov. 16-Dec. 10, 1956.

235773 ASARUM SP. 677 Along mountain railroad, Kosugidani, Yakushima. Leaves large cordate, variegated; flowers purple.

235774 ASARUM SP. 710 Between Ambo and Miyanoura, Yakushima. Large leaves, handsome white variegations over entire leaf.

235775 ASARUM SP. 711 Between Ambo and Miyanoura, Yakushima. Small-leaved species with variegation restricted to white dots.

235776 BUXUS MICROPHYLLA var. JAPONICA 658 At Hana-no-ego, 4,800 feet, Yakushima. Typical, but from high elevation.

235777 CHLORANTHUS SP. 721 Isso River, Yakushima. Small evergreen shrub with coarsely serrate leaves; bright yellow fruit.

235778 CHRYSANTHEMUM SP. 704 Along roadside, between Kurio and Onoaida, Yakushima. Species with leaves tomentose beneath; flowers white.

235779 DENDROBIUM SP. 683 Along logging trail above Kurio, Yakushima. An epiphyte, leaves lanceolate; flowers not seen.

235780 DENDROBIUM SP. 706 Along stream on rocks, between Kurio and Onoaida. Epiphytic orchid; flowers not seen. Probably same as 235779.

235781 EURYA YAKUSIMENSIS 654 At Hana-go-ego, 4,800 feet, sub-alpine zone, Yakushima. Small evergreen shrub, leaves ovate and crenate; flowers white, fruit black. A distinct and hardy species. Not in cultivation.

235782 GESNERIACEAE 716 Isso River, Yakushima. Prostrate plant on rocks, leaves coarse, large, coarsely serrate; flowers not seen.

235783 GOODYERA SP. 697 Between Kurio and Onoaida. Small terrestrial orchid in moist shady areas, with distinct variegation along midrib of leaf.

235784 GOODYERA VELUTINA 682 Along logging trail above Kurio, Yakushima. Terrestrial orchid, white markings along veins; flowers pink.

235785 HYPERICUM YAKUSIMENSE 679 At Hana-no-ego, 4,800 feet in alpine bog. Dwarf species among mosses, rare.

235786 JUNIPERUS CHINENSIS var. SARGENTII 656 At Hana-no-ego, 4,800 feet, Yakushima. A dense procumbent form leaves thread-like dark green.

235787 LYCOPodium SUBDISTICHUM 684 On tree trunks, in moist mountain forest, Kurio, Yakushima. Lycopod with long trailing stems, leaves narrowly pointed.

235788 TRICHOMANES SP. 718 Along Isso River, Yakushima. Delicate fern, leaves pinnate, pinnae divided.

235789 UNDET. (ORCHID) 678 Above Kosugi-dani, 4,200 feet, Yakushima. Terrestrial, small orchid, leaves narrow, lanceolate; flowers not seen.

235790 UNDET. (ORCHID) 703 Along stream between Kurio and Onoaida, Yakushima. Small epiphyte, leaves ovoid, forming a rosette; flowers not seen.

235791 UNDET. (ORCHID) 709 Along stream between Kurio and Onoaida, Yakushima. Small epiphyte, leaves thick and fleshy.

235792 UNDET. (ORCHID) 717 Isso River, Yakushima. Terrestrial species, leaves forming a rosette; flowers purple on short spike.

235793 UNDET. (ORCHID) 719 Along Isso River, Yakushima. Epiphyte with thick heeled leaves, narrow lanceolate.

235794 UNDET. (ORCHID) 720 Along Isso River, Yakushima. In moist humus of conifer forest. A terrestrial species with broad lanceolate leaves, surface faintly variegated; flowers yellow-brown.

235891-953 CHRYSANTHEMUM varieties from Seikoen Nursery, Kanemaru, Hiroshima-ken.

235891 Asinanosugata - large tubular pink

235892 Asinanoyuki - large tubular white

235893 Benitaiyo - slender tubular pink

235894 Hakutiyonomai - slender tubular white

235895 Himekomati - slender tubular purple

235896 Hosizukiya - slender tubular purple

235897 Kiyoukomati - slender tubular red

235898 Kotiyounomai - slender tubular yellow

235899 Maitidori - slender tubular purple

235900 Maizikanokoe - slender tubular red

235901 Okinanotome - slender tubular white

235902 Okitunami - large tubular pink

235903 Ougnnohikare - slender tubular yellow

235904 Sakuramurasame - slender tubular pink

235905 Seikobizan - slender tubular red

235906 Seikokinsei - large tubular yellow and red

235907 Seikonusugata - large tubular white
235908 Seikonourma - slender tubular pink
235909 Seigiyokunohikare - large tubular purple
235910 Taihobizan - slender tubular pink
235911 Taihoemaki - slender tubular pink
235912 Tatutagaya - slender tubular red
235913 Tiyonoyuki - slender tubular white
235914 Toriyumom - large incurved pink
235915 Totenko - slender tubular red
235916 Uguisunokoe - slender tubular yellow
235917 Urakiyokunoaki - slender tubular pink
235918 Utatane - slender tubular red
235919 Utiyudan - large incurved red
235920 Yozakura - large incurved purple
235921 125 - slender tubular white
235922 161 - slender tubular yellow
235923 173 - large incurved purple
235924 1007 - slender tubular pink
235925 1028 - slender tubular yellow
235926 1042 - slender tubular pink
235927 1125 - large tubular pink
235928 1150 - large tubular white
235929 1363 - large tubular yellow
235930 1154 - slender tubular white
235931 1158 - slender tubular red
235932 1159 - slender tubular white
235933 1186 - slender tubular bronze
235934 1189 - large tubular yellow
235935 1194 - large tubular pink
235936 1208 - slender tubular red
235937 1209 - slender tubular bronze
235938 1218 - large incurved purple
235939 1220 - slender tubular red
235940 1270 - large incurved white
235941 1306 - large tubular yellow
235942 1309 - large tubular purple
235943 1312 - large ball pink
235944 1318 - large tubular yellow
235945 1323 - large ball yellow
235946 1325 - large single yellow
235947 1334 - slender tubular white
235948 1338 - large tubular yellow
235949 1341 - large tubular yellow
235950 1343 - large ball white
235951 1344 - large ball yellow
235952 1346 - large ball white
235953 1352 - large ball white

235954-990 Plants collected on Yaku, Tanega Islands and from southern Kyushu, Nov.
16 - Dec. 10, 1956.

235954 AERIDES JAPONICUM 745 Furuta Nat. Forest, Tanigashima. Small epiphyte
on logs, flowers whitish.
235955 DIPLAZIOPSIS JAVANICA 712 Along stream, between Ambo and Miyanoura,
Yakushima. Large evergreen fern with thick leathery fronds.

235956 ARISAEMA SP. 666 Above Kosugidani, 3,600 feet, Yakushima.

235957 CALANTHE AUSTRO-KIUSIUENSIS 754 Along stream, Furuta Nat. Forest, Tanegashima. Terrestrial orchid, leaves large, ovate; flowers white, to pink.

235958 CALANTHE SP. 767 Onigasawa Forest, Tanegashima. Large terrestrial orchid, flowers white or pink.

235959 CALANTHE SP. 771 Hirakiki Mt. about 1,200 feet, Satsuma Pref. terrestrial species, large leaves, veins prominent.

235960 CALANTHE SP. 775 Hirakikiyama, Satsuma Pref. Terrestrial species, leaves more or less prostrate, dark green, leathery.

235961 CELASTRUS PUNCTATUS 737 Along sand dunes, Nishi-no-omote, Tanegashima. Deciduous climber, stems angular; leaves ovate, serrate; fruit red.

235962 CHEIROSTYLUS SP. 736 Tachimoto Nat. Forest, Tanegashima. Small epiphyte, flowers not seen.

235963 CIRRHOPELALUM MAKINOANUM 769 Onigasawa Nat. Forest, Tanegashima. Epiphytic orchid, leaves fleshy; flowers purple.

235964 CLEMATIS CRASSIFOLIA 753 Along sunny road, on Cryptomeria, Furuta Nat. Forest, Tanegashima. Evergreen vine, leaves ovate, fleshy; flowers in dense clusters, white, marked purple.

235965 CYMBIDIUM NAGIFOLIUM 751 Furuta National Forest, Tanegashima. Terrestrial, leaves fleshy; flowers greenish-white.

235966 CYMBIDIUM SIMONSIANUM 743 Along stream, Furuta Nat. Forest, Tanegashima. Epiphyte, leaves long, grasslike; flowers yellow.

235967 CYMBIDIUM VIRESCENS 776 Hirakiki Yama, Satsuma Pref. Terrestrial with narrow leaves; flowers not seen.

235968 EURYA EMARGINATA var. MICROPHYLLA 787 Harada Garden, Kurume. A form with tiny round leaves; rare.

235969 GOODYERA MAXIMOWICZIANA 774 Hirakiki Nat. Forest, Satsuma Pref., Terrestrial orchid with pink stripe down leaf midrib. Flowers pink.

235970 LINDSAYA SP. 649 In mountains above Kosugedani, 3,000 feet, Yakushima. Small evergreen fern, growing on moist granite, among mosses.

235971 LUISIA TERES 585 Above sea road between Nagata and Yoshida, Yakushima. Epiphyte, leaves terete; flowers small, yellow.

235972 PHAJUS MACULATUS var. MINOR 773 Hirokiki Mt. Satsuma Pref. Similar to 235974 but with smaller leaves and smaller spotting.

235973 OSMANTHUS SP. 786 From Horticultural Field Sta. Kurume. Variegated form, probably O. fragrans.

235974 PHAJUS MACULATUS 750 Furuta Nat. Forest, Tanegashima. Terrestrial leaves marked with handsome yellow spots; flowers 2 to 3 inches high, yellow.

235975 *PSILOTUM NUDUM* 764 Furuta Nat. Forest, Tanegashima. Typical wild form.

235976 *RHODODENDRON KIUSIANUM* 785 From Kyushu Agri. Exp. Sta., Kurume, white form.

235977-984 *RHODODENDRON* SP. Horticultural Varieties from Kyushu Agri. Exp. Sta., Kurume.

235977 777 Hirado strain - Tanimo no yuki, white
235978 778 Hirado strain - Eiko, Reddish purple
235979 779 Hirado strain - Hei-wa-no-hikari - salmon
235980 780 Hirado strain - Ruriko, purple, large
235981 781 Hirado strain - Myoken, pink
235982 782 Hirado strain - Momoyama, pink, large
235983 783 Hirado strain - Tensho, pin, large
235984 784 Akashi hybrid - Miyonosakae, pink with white center

235985 *SYMPLOCOS LUCIDA* 747 Furuta National Forest, Tanegashima. Evergreen shrub to 8 feet, leaves alternate; fruit blackish.

235986 *TROPIDIA NIPPONICA* 744 Furuta Nat. Forest, Tanegashima. Small terrestrial orchid, leaves ovate, veins prominent.

235987 *PHAJUS* SP. 727 Along shady bank, Koseda, Yakushima. Large terrestrial flowers pink.

235988 *TRICHOMANES* SP. 731 Along streams, Tachimoto Nat. Forest, Tanegashima. Handsome evergreen climbing fern, fronds lanceolate, deeply cut, transparent.

235989 *OBERONIA* SP. 732 Along stream bed, Tachimoto Nat. Forest, Tanegashima. Small epiphytic orchid, with dichotomous branching; flowers not seen.

235990 *ORCHIS* SP. 768 Onigasawa Forest, Tanegashima. Terrestrial species, large leaves; flowers white, up to 50 or more on a stalk.

236013-015 *ARALIA CORDATA* Ministry of Agriculture, Special Products Section, Tokyo.
236013 *ARALIA CORDATA* 793 Purple bud type
014 *ARALIA CORDATA* 794 Aichi bozu
015 *ARALIA CORDATA* 795 Kan udo

236016 *CORNUS KOUSA* 792 Open fields near Aokigahara Forest, Fuji Yama. A red flowered form; wild.

236017-019 Plants from garden of Dr. H. Takeda, Tokyo

236017 *BOEHMERIA BILOBA*
236018 *SAXIFRAGA FORTUNEI*
236019 *TRICYRTIS FORMOSANA*

236020-024 Plants from Saitama Plant Acclimatization Garden, Angyo, Saitama-ken

23620 *ILEX CRENATA* - variegated form
236021 *ILEX CRENATA* - variegated form
236022 *ILEX SERRATA* - white fruited
236023 *ILEX SERRATA* var. *SIEBOLDI*
236024 *ILEX SUGEROKI* var. *LONGIPEDUNCULATA*

236028-039 CHRYSANTHEMUM varieties from Shinjuku Imperial Garden, Tokyo

236028	Bijo no obi	236034	Misogi
236029	Hakusa	236035	Namari
236030	Hikari	236036	Tomari
236031	Ishibumi	236037	Toyamanoyuki
236032	Kinkochō	236038	Yakikoyama
236033	Rizashi	236039	Yukin

236040-079 CHRYSANTHEMUM varieties from Shuhō Nursery, Kanemaru, Ashina, Hiroshima, Japan

236040	Beni-Taiyo
236041	Einno - Izumi
236042	Hagino-Siratum
236043	Hagoromo
236044	Hakuon
236045	Hanagasumi
236046	How-o
236047	Jinton
236048	Jugoya-Zyugoya
236049	Kaorn-Kikusui
236050	Kashino-Neiro
236051	Kisetu
236052	Kinkazan
236053	Kinzanno-Nagare
236054	Kiunno-Kagasaki
236055	Konagare
236056	Konkokuno-Sadamari
236057	Maiogi
236058	Mangetuno-Sirabe
236059	Meikyo
236060	Momizino-Sato
236061	Nanenno-Kimami
236062	Renkano-Tomo
236063	Seigun
236064	Seikino-Yume
236065	Shuhō-no-Akatuki
236066	Shuhouno-Bi
236067	Sihon
236068	Sinnhonno-Hikari
236069	Sinnhonno-Bigyoku
236070	Sinrokuno-Aki
236071	Sinrokuno-Sugata
236072	Sinrokuno-Tuga
236073	Siraho
236074	Siratakuno-homare
236075	Soburen
236076	Takino-Momizi
236077	Tengokuno-Sirabe
236078	Toyamano Kuma
236079	Zuisei

236115-124 Plants purchased from Mr. S. Sugiyama, Yamato Noyen Nursery, Yamamoto, Hyogo-ken

236115 ANGRAECUM - Seito fukurin
236116 ANGRAECUM - Suruga fukurin
236117 ANGRAECUM - Toto fukurin
236118 RHODEA JAPONICA - Gunyo
236119 RHODEA JAPONICA - Kinshorin
236120 RHODEA JAPONICA - Kokonrin
236121 RHODEA JAPONICA - Kotobuki
236122 RHODEA JAPONICA - Nimen Korio Fukurin
236123 RHODEA JAPONICA - Ryukosei
236124 RHODEA JAPONICA - Shima kouryu

236125-128 CHRYSANTHEMUM Varieties from Hirakata Municipal Garden, Hirakata City

236125 Kari no tsuki - white
236126 Kokyo no aki - yellow
236127 Miyama nishiki - orange
236128 Taiho no hana - red

236129 ASIER ASAGRAYI K. Suzuki Nursery, Tomiuko-machi, Kanagawa, Yokohama. A small perennial rock garden species, with bright purple flowers; native to Amamioshima.

236130-135 PSILOTUM NUDUM Varieties from Mr. T. Rokujo, Toshima-ku, Tokyo

236130 Howo yanagi
236131 Kinkaku
236132 Kin tsukumo
236133 Orizuru
236134 Sankonishiki
236135 Sui shoraku

236136-140 PSILOTUM NUDUM Varieties from Tai-haku Nursery, Asaki-machi, Gose, Nara Pref.

236136 No. 1
236137 No. 2
236138 No. 3
236139 No. 4
236140 No. 5

236158-207 CHRYSANTHEMUM Varieties from Mr. S. Takahaski, Ki-Machi, Mishima City, Japan

236158 Ashina-no-yuki - white
236159 Arima-no-aki - light brown
236160 Benitaiyo - red
236161 Daj Kokka - red
236162 Fukusuke - pink
236163 Furusato-no-tsuki - yellow
236164 Hanachidori - reddish yellow
236165 Hatsugari-no-koe - yellow
236166 Himekomachi - light purple red
236167 Hototogisu - yellow
236168 Itsukushima-no-kei - purple
236169 Kinen-no-sakura - pink

236170 Kintaro - yellow
236171 Kishi - yellow
236172 Kogen-no-tsuki - white
236173 Kokaji - yellow
236174 Kokka - white
236175 Konan - brocade
236176 Kumoi - white
236177 Kyukatyo - pink
236178 Mangetsu-no-shirabe - yellow
236179 Momokanoko - pink
236180 Nishiki-no-sode - yellow
236181 Ogon-no-izumi - yellow
236182 Rosei-no-yume - light pink
236183 Sanyo-no-tsuki - yellow
236184 Sanyo-no-yuki - white
236185 Seiki-no-hanna - white
236186 Seikokinesei #1 - yellow
236187 Seikokinesi #2 - yellow
236188 Shiga-no-hikari - purple
236189 Shiga-no-miyako - pink
236190 Shikinran - red
236191 Shinnen-no-yuki - white
236192 Shinroku-no-shiori - pink
236193 Shinroku-no-sugata - pink
236194 Shinroku-no-yamabuki - yellow
236195 Susomoyo - white
236196 Syokasen - white
236197 Syowa-no-sakae - yellow
236198 Taiheiraku - yellow
236199 Taiho-no-hana - red
236200 Taiho-no-mine - white
236201 Taiho-no-tsuki - white
236202 Takachibo - yellow
236203 Tamadsuki - pink
236204 Tenshi - white
236205 Tsuki-no-miyako - white
236206 Yume-no-kayoifi - light pink
236207 Zyugoya - white

236210-254; 236419-420 Horticultural varieties of plants purchased from Nakada Nursery, Angyo, Kawaguchi, Saitamaken

236210 AUCUBA JAPONICA #1 variegated
236211 AUCUBA JAPONICA #2 variegated
236212 ARDISIA CRISPA
236213-221 CAMELLIA SASANQUA varieties

236213 Ginryu
236214 Hiya asobi
236215 Motio no sio
236216 Negi si beni
236217 Oho mi goromo
236218 Setugetuka
236219 Setsusan
236220 Showa no sakae
236221 Tuki no kasa

236222 CHAMAECYPARIS PISIFERA var. SQUARROSA (variegated)

236223-232 CRYPTOMERIA JAPONICA varieties

236223 Araucarioides

236224 Cristata

236225 Ikari sugi

236226 Jindai sugi

236227 Ogon sugi

236228 Spinolis

236229 Taisho tamasugi

236230 Yoshino sugi

236231 Dwarf #1

236232 Dwarf #2

236233 ILEX CRENATA var. NUMMULARIA

236234 ILEX CRENATA Variety Sirofokurin

236235-236 JUNIPERUS CHINENSIS

236235 Ogon-Ibuki

236236 Tama-Ibuki

236237 MAHONIA FORTUNEI

236238-239 NANDINA DOMESTICA

236238 Goshiki Nanten

236239 Sasaba Nanten

236240 OSMANTHUS FRAGRANS var. THUNBERGII

236241 OSMANTHUS ILICIFOLIUS Ogon hiragi

236242 PACHYSANDRA TERMINALIS var. VARIEGATA

236244-245 TERNSTROEMIA JAPONICA

236244 Hagikano - variegated

236245 Magohachi - variegated

236246-247 THEA SINENSIS Varieties

236246 Microphylla

236247 Beni bana cha

236248-249 THUJOPSIS DOLABRATA

236248 Nana

236249 Variegata

236250 TRACHELOSPERMUM ASIATICUM, Variety Hatuyuki katura - leaves of several colors.

236251 VIBURNUM ODORATISSIMUM - variegated

236252-254 ZELKOVA SERRATA varieties

236252 Fuiri keaki (variegated)
236253 Shidare keaki (weeping)
236254 Tukumo keaki (dwarf)

236255 ANGELICA MAYEBARANA Kagoshima Univ. Botanic Garden, Kyushu. Herb with columbine-like leaves; flowers in umbel, white.

236256 BRASSICA OLERACEA variety VIRIDIS T. Sakata, Yokohama, Japan. White Nagoya type ornamental kale.

236257 (As above) Red Nagoya type

236258 (As above) White Tokyo type

236259 (As above) Red Tokyo type

236260 DISTYLIUM RACEMOSUM. Seed from trees in Gegu Shrine, Ise City, Mie Pref. Evergreen tree.

236262 HEMEROCALLIS SP. About 2,400 feet altitude. Yatsugatake Mts.

236263 HEMEROCALLIS THUNBERGII About 3,600 feet altitude. Yatsugatake Mts.

236265 SPILANTHES OLERACEA From Ministry of Agriculture, Tokyo. A prostrate herbaceous plant; flowers yellow, in small button-like heads. Blooms profusely during July and August.

236419 CAMELLIA SASANQUA - Kougoku

236420 CRYPTOMERIA JAPONICA - Midori sugi

Seeds collected on Yaku and Tanega Islands, also southern Kyushu, Nov. 16-Dec. 10, 1956.

237835 ACER RUFINERVE 687 Along mountain stream above Kurio, Yakushima. Handsome maple to 30 feet, barked striped, petioles red, leaves 3 to 5 lobed, fall color yellow.

237836 ADINA SP. 685 Above Kurio, in mountain forest at 1,200 feet, Yakushima. Evergreen tree to 25 feet, leaves ovate, entire; fruit a ball-like capsule on long stalks.

237837 ALPINIA KUMATAKE 596 Along sea road, near Miyanoura, Yakushima. Herbaceous plant, leaves broad lanceolate; fruit, large, red, in spines.

237838 ALPINIA SPECIOSA 739 Along sandy knolls, Nishi-no-omote, Tanegashima. Large herbaceous plant; flowers white, fruit a capsule, many seeded.

237839 PEUCEDANUM JAPONICUM 715 Along seacoast between Ambo and Miyanoura, Yakushima. Herbaceous plant, flowers white in umbels, stalks 12 inches long.

237840 ARDISIA CRENATA 674 Below Kosuge dani, 1,800 feet, Yakushima. Evergreen shrub to 2 feet, leaves ovate, crenate; fruit red in large clusters.

237841 ARDISIA CRISPA 652 Along mountain path, Kosuge dani, Yakushima. Evergreen shrub, leaves narrow lanceolate, crenate; fruit red in panicles on long stalks.

237842 ARDISIA JAPONICA 788 Along roadside near Tachikawa, Tokyo-to, Small ground covering species to 6 inches, fruit red, solitary, large.

237843 ARDISIA SP. 622 Along Miyanoura River, Manno Nat. Forest, Yakushima. Evergreen tree to 20 feet, leaves alternate, ovate; fruit reddish black, in clusters.

237844 ARDISIA SP. 623 Along Miyanoura River, Manno Nat. Forest, Yakushima. Evergreen tree to 15 feet, leaves elliptic, dark green above, pale beneath; fruit round, reddish, in clusters.

237845 ARDISIA SP. 694 Along seacoast, Onoaida, Yakushima. Small evergreen tree, leaves pale green, clustered at tips of branches, elliptic; fruit red.

237846 ARISAEMA SP. 666 Along Mt. path above Kosugi dani, about 3,600 feet, Yakushima.

237847 ARISAEMA SP. 670 Along Mt. path above Kosugi dani, about 3,000 feet, Yakushima.

237848 ARISAEMA SP. 763 Along roadside, near Anno, Tanegashima. Tall species to 4 feet, two leaves divided into 7 parts; seeds red.

237849 ARISAEMA SP. 772 Hirakiki mountains, about 1,200 feet, Satsuma Pref. Typical of genus.

237850 BREDIA HIRSUTA 676 Below Kosugi dani, in moist rocky shaded places. A sub-shrub, with succulent stems; flowers in terminal clusters, purple.

237851 BUDDLEIA CURVIFLORA 708 Along searoad, between Kurio and Ambo, Yakushima. A shrub to 8 feet, leaves broad lanceolate; flowers in long pointed panicles, purple.

237852 CALICARPA JAPONICA var. LUXURIANS 621 Along logging road in Manno Nat. Forest, Miyanoura, Yakushima. Shrub to 15 feet, leaves large ovate, narrowly pointed; fruit bright purple, in dense clusters.

237853 CALICARPA TOSAENSIS 601 Along sea road, between Miyanoura and Isso, Yakushima. Deciduous shrub to 10 feet, leaves ovate - lanceolate; fruit in dense panicles.

237854 CAMELLIA SASANQUA 791 Upper reaches of Miyanoura River, Manno Nat. Forest, Yakushima. Typical for species but rather high elevation.

237855 CAMELLIA HAYAOI 660 Above Kosugi dani, about 4,200 feet, Yakushima. A camellia species newly described and closely related to C. japonica, characterized by large shiny black fruit. Probably has same standing as does C. rusticana.

237856 CANAVALIA LINEATA 693 Seaside plant, Onoaida, Yakushima. Vine, leaves trifoliate, leaflets ovate; flowers yellow in short raceme, a legume with large seeds.

237857 *CINNAMOMUM BREVIFOLIUM* 713 Along seacoast between Ambo and Miyanoura, Yakushima. Evergreen shrub, foliage dense, leaves ovate, small; fruit black.

237858 *CINNAMOMUM DAPHNOIDES* 740 Used as small street tree, Nichi-no-omote, Tanegashima. A small tree, shrubby, leaves ovate, tomentose beneath; fruit black. Tolerant of dry, arid conditions.

237859 *CINNAMOMUM PEDUNCULATUM* 605 Isso River, Yakushima. Evergreen tree, stems yellow-green, leaves ovate, fruit on long stalks; black.

237860 *CRAWFURDIA TRINERVIS* 564 Along road from Kinomoto to Oase, Kii, Wakayama Pref. Scandant herbaceous species; flowers pale purple, tubular, fruit reddish purple.

237861 *DAMNACANTHUS INDICUS* 789 Upper reaches, Miyanoura River, Manno Nat. Forest, Yakushima. Small evergreen shrub, leaves opposite, entire, stipules as spines; fruit red.

237862 *DAPHNE SP.* 675 Below Kosugidani, sunny banks, Yakushima. Evergreen tree to 15 feet, leaves entire except a few tip serrations; fruit blue.

237863 *DAPHNIPHYLLUM MACROPODUM* 604 Above Isso River, Yakushima. Tall evergreen tree, markedly characterized by red coloring on leaf stalks; fruit black.

237864 *DENDROPANAX TRIFIDA* 733 Tachimoto Nat. Forest, Tanegashima. Small shapely tree leaves entire or 3 to 5 lobed; fruit purple black.

237865 *DESMODIUM SP.* 620 Along sea road, between Miyanoura and Isso. Small leguminous shrub, leaves trifoliate; pod a lomentum.

237866 *DESMODIUM SP.* 646 (Legume) Along Miyanoura River, Manno Nat. Forest, Yakushima. Small woody shrub to 3 feet, leaves trifoliate; pod a lomentum.

237867 *ELAEAGNUS CRISPA* 588 Along roadside, between Isso and Miyanoura, Yakushima. Small tree or shrub, semi-evergreen, leaves silvery beneath; fruit round, pale red with minute, scaly hairs; edible.

237868 *ELAEOCARPUS JAPONICUS* 603 Along stream bed, Isso River, Yakushima. Evergreen tree, bark gray, leaves in terminal clusters, whorled, ovate with serrate margin; fruit in raceme, bright blue.

237869 *EUGENIA SP.* 600 Along stream near Tomaiki, Yakushima. Evergreen shrub to 10 feet, bark light brown, leaves opposite entire; fruit black.

237870 *EUGENIA SP.* 671 Below Kosugi dani, 3,300 feet, Yakushima. Evergreen shrub, leaves opposite, entire; fruit terminal, black.

237871 *EURYA JAPONICA* 650 In mountains above Kosugi dani, Yakushima. Evergreen shrub, leaves alternate, crenate; fruit black, axillary on short stalks.

237872 *GORDONIA ANOMALA* 790 Botanic Garden, Kagoshima University, Kagoshima Pref. Tree to 18 feet, probably evergreen; flowers large, white, fragrant.

237873 *HELICIA COCHINCHINENSIS* 741 Along road near Nakata, Tanegashima. Small evergreen tree, leaves alternate, ovate, crenate, dark green. Cultivated, suited to dry conditions.

237874 *IDESIA POLYCARPA* 746 Along road near Furuta Nat. Forest, Tanegashima. Deciduous tree to 25 feet or more; fruit red, in large pendant clusters.

237875 *ILEX HANCEANA* 752 Along roadside, Furuta Nat. Forest, Tanegashima. Evergreen holly to 25 feet, leaves broad-ovate, entire; fruit red, small, perhaps smallest of all species noted.

237876 *ILEX INTEGRA* 608 Along Isso River, Isso Yakushima. Tree to 30 feet, evergreen; fruit large red, ovoid.

237877 *ILEX LIUKIENSIS* 587 Along banks of Isso River, Isso, Yakushima. Handsome evergreen holly to 20 feet, leaves dark green, glossy, slightly undulate; fruit red in dense clusters, small.

237880 *ILEX LIUKIENSIS* 607 Along Isso River, Yakushima. Evergreen holly to 20 feet, leaves dark shiny green, ovate; fruit red in 2 to 5 fruited clusters, small.

237878 *ILEX MUTCAGARA* 659 Above Kosugi dani, near Hana-no-ego, about 4,500 feet, Yakushima. Small tree to 15 feet, evergreen, leaves crenate; fruit black, 2 to 3 in a cluster.

237879 *ILEX ROTUNDA* 681 Along coastal road between Ambo and Manyu, Yakushima. Evergreen species to 30 feet, leaves large, broad ovate, entire; fruit red, often small, but exceptionally large in this locality.

237881 *ILLICIUM RELIGIOSUM* 663 Above Kosugi dani, about 3,600 feet, Yakushima. Evergreen tree to 20 feet, leaves clustered, ovate, lanceolate, entire; fruit a flattish capsule in 8 sections.

237882 *JUNIPERUS CONFERTA* 738 Along sand dunes near Nishi-no-omote, Tanegashima. Prostrate species, main stems lying flat, secondary branches ascending; berries large purple. Stems rooting in sand.

237883 *KADSURA JAPONICA* 593 Along Nagata River, Yakushima. Vine-like shrub, evergreen, leaves oval, shiny; flowers yellowish white; berries scarlet.

237884 *LAGERSTROEMIA FAURIEI* 686 Above Kurio, in mountain forest, about 1,200 feet, Yakushima. Handsome tree about 20 feet tall with red-brown bark, flaked green; fruit a capsule with 10 to 20 seeds.

237885 *LECANORCHIS JAPONICA* 615 Moist shady banks, Isso River, Yakushima. Terrestrial orchid, leafless stems; seed pods about 2 inches long, flowers not seen.

237886 *LITHOCARPUS EDULIS* 729 Tachimoto Nat. Forest, Tanegashima. Evergreen oak with large oblong edible acorns.

237887 *LONICERA SP.* 700 Along roadside between Kurio and Onoaida, Yakushima. Vine, leaves ovate; fruit on long stalk, large, black, several to a cluster.

237888 *MITCHELLA UNDULATA* 653 Moist woods, above Kosugi dani, about 3,600 feet, Yakushima. Prostrate evergreen species, leaves ovate; fruit small, red.

237889 *MORINDA UMBELLATA* 594 Along roadside, between Miyanoura and Isso, Yakushima. Scandent evergreen with broad leaves; fruit orange.

237890 *PSYCHOTRIA SERPENS* 589 Along rocky stream, Isso River, Yakushima. Evergreen vine, leaves opposite, narrow ovate; fruit white, Especially attractive vine.

237891 *PSYCHOTRIA SP.* 624 Along Miyanoura River, Manno Nat. Forest, Yakushima. Small evergreen shrub, leaves leathery, oblong; fruit in a corymb, red.

237892 *PSYCHOTRIA SP.* 705 Seaside plant, along rocky ravines, Onoaida, Yakushima. Evergreen tree, leaves clustered or whorled, dark green, ovate-lanceolate; fruit red.

237893 *QUERCUS GILVA* 742 Along forest road, Furuta Nat. Forest, Tanegashima. Evergreen tree to 40 feet, leaves ovate, brittle, sharp teeth.

237894 *QUERCUS GLAUCA* 749 Along forest stream, Furuta Nat. Forest, Tanegashima. Evergreen oak, leaves ovate, rounded at base, teeth at apex.

237895 *QUERCUS WRIGHTII* 698 Along seacoast road, Onoaida, Yakushima. Beach plant, evergreen shrubby tree, leaves tomentose beneath.

237896 *QUERCUS SP.* 730 Along stream bed, Tachimoto Nat. Forest, Tanegashima. Evergreen species, probably 60 feet, acorns ovate, large.

237897 *RAPHIOLEPIS SP.* 726 Along stream bed, Koseda, Yakushima. Small evergreen tree, to 20 feet, leaves whorled, shiny, finely crenate; fruit blackish.

237898 *RAPHIOLEPIS SP.* 734 In Tachimoto Nat. Forest, Tanegashima. Tall tree, evergreen, fruit black large; impossible to secure a specimen of tree.

237899 *RHAMNUS SP.* 657 Above Kosugi dani, about 1400 meters, Yakushima. Deciduous tree to 30 feet, leaves ovate-lanceolate; fruit round, black, on short stalks.

237900 *SARCANDRA GLABRA* 595. Along seacoast road, semi shade, moist rock, Miyanoura, Yakushima. Evergreen subshrub, leaves, ovate coarsely toothed; fruit in terminal clusters, orange to yellow.

237901 *SARCANDRA GLABRA* 766 Onigasawa Nat. Forest, Tanegashima. Similar to 595 but a dark red fruited form. I have seen both forms growing extensively.

237902 *SKIMMIA JAPONICA* 673 Along logging road below Kosugidani, Yakushima. Evergreen shrub, stems greenish, leaves clustered; fruit in terminal cluster, red.

237903 *SMILAX CHINA* 597 Along sea road at Tomaiko, Miyanoura, Yakushima. Large vigorous species, few thorns; fruit large, showy, bright red in many-fruited hanging clusters.

237904 *SOLANUM SP.* 599 Along stream bed near Tomaiko, Miyanoura, Yakushima. Perennial, herbaceous, leaves broad ovate; fruit round, bright red, prominent calyx.

237905 *SORBUS SP.* 655 At Hana-no-ego, 1600 meters, Yakushima. Tree to 20 feet, deciduous; fruit, red in large cluster.

237906 *SORBUS SP.* 680 Above Kosugi dani, about 4,500 feet, Yakushima. Deciduous tree to 20 feet; fruit, red, stalked.

237907 *STACHYURUS LANCIFOLIUS* 619 Along Isso River, Yakushima. Deciduous tree, yellow flowers before the leaves, small in short raceme.

239702 *SYMPLOCOS LUCIDA* 747 Along sunny road, Furuta Nat. Forest, Tanegashima. Evergreen shrub, to 8 feet, leaves alternate, ovate finely crenate; fruit black. Seeds.

237908 *TROCHODENDRON ARALIOIDES* 664 Above Kosugidani, about 4, 350 feet, Yakushima. Evergreen tree to 60 feet, leaves ovate to obovate, clustered at tips of branchlets; fruit a capsule.

237909 *TURPINA TURNATA* 695 Along seacoast, Onoaida, Yakushima. Evergreen shrub, leaves ovate, veins conspicuously depressed; fruit red in terminal clusters.

237910 *VACCINIUM BRACTEATUM* 586 Along rocky river bed, Isso River, Yakushima. Small evergreen tree to 15 feet, leaves alternate, narrowly ovate; fruit racemose, black.

237911 *VACCINIUM SP.* 707 Along coastal road between Kurio and Onoaida, Yakushima. Evergreen species to 15 feet, leaves ovate, shining green; fruit reddish.

237912 *VILLEBRUNEA PEDUNCULOSA* 699 Along stream between Kurio and Onoaida, Yakushima. Evergreen tree to 20 feet, leaves ovate, thin; flowers borne along stem on last years wood, greenish, typical of urticaceous plants.

237913 *WIKSTROEMIA SP.* 662 Above Kosugidani, 3, 300 feet, Yakushima. Evergreen tree to 30 feet, leaves ovate, crenulate, shiny green; fruit black, small, elongate.

237914 UNDET. 647 Along Miyanoura River, Manno Nat. Forest, Yakushima. Tree to 18 feet, evergreen, leaves elliptic, serrate; fruit black in short cluster. Probably same as 622. (*Ardisia* sp. 237843)

237915 UNDET. 722 Along Isso River, on rocky stream bank, Yakushima. Evergreen tree, 25 feet tall, leaves alternate, obovate, margin crenate; fruit greenish-blue.

237916 UNDET. 735 In Tachimoto Nat. Forest, Tanegashima. Evergreen shrub, fruit black. Probably a *Vaccinium*.

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Rhododendron japonicum occurs in open boggy meadows on the Yatsugatake Mountains. Trees in background are *Larix* and *chamaecyparis*.



The coastline of southern Shikoku is a series of rugged projections as the mountains approach the sea.



At Murotozaki, Shikoku, the broadleaved evergreen forest ascends steeply from the coastal road.



The steep rocky cliffs at Ashizurizaki support only herbaceous plants, such as *Hemerocallis aurantiaca*, *Peucedanum japonicum*, and several *chrysanthemum* species.

PLATE 2



Hemerocallis aurantiaca var. littorea blooming along sea-cliffs in October, Ashizurizaki, Shikoku.



Peucedanum japonicum, an umbelliferous plant, occurs on the rocky sea-cliffs at Ashizurizaki, Shikoku.

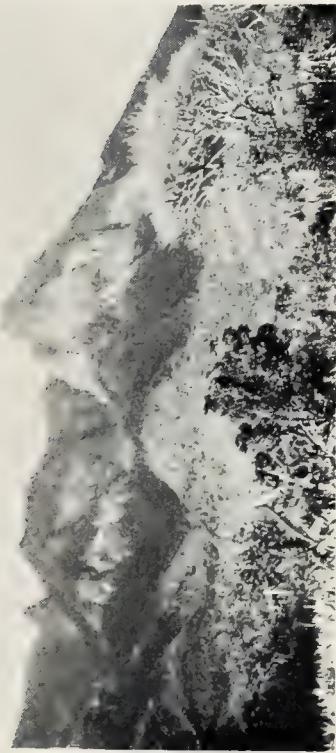


Sarcandra glabra is a small evergreen shrub with either orange or red fruits. It occurs throughout southern Japan, Yakushima, and Tanegashima.



Quercus wrightii, azaleas, and cinnamomum occur commonly along the rocky beaches of Yakushima, showing influence of wind and weather.

PLATE 3



A view to the mountains from the beach road at Onoaida,
Yakushima.



Miyanouradaki rises to 6300 feet above the small logging
port of Ambo, Yakushima.



Hana-no-ego (Flowering-swamp) is a sphagnum bog on
Miyanouradake, Yakushima. Clumps of Juniperus chinensis
var. sargentii are spotted throughout this sub-alpine meadow.

The peaks above Kosugidani, Yakushima are covered with
windswept firs, showing considerable evidence of typhoon
damage.

PLATE 4



Piper kadsura and Ficus pumila, growing together
on tree trunks at Murotozaki, Shikoku.



Forest trails follow boulder-strewn streams on
Miyanouradaki, Yakushima.

PLATE 5



A forest of Phyllostachys edulis, with some cryptomeria and undergrowth, in southern Kyushu.



The forests of Yakushima are a mixture of broadleaved evergreen trees and cryptomeria. (Note tree fern at lower left.)



Eurya emarginata growing in open sunny fields of Tanegashima.



Ilex liukiuensis, a red-fruited, evergreen species of holly occurs in Yakushima. It has not been introduced previously.



Daphniphyllum macropodum grows on the mountains of Yakushima and is characterized by red petioles.



Juniperus conferta spreads prostrate along the beaches of Tanegashima. The main stems are frequently rooted to the sand.



Pinus armandi, growing on hillside on Tanegashima, reaches 50 feet in height.



Orchids are numerous on both Yakushima and Tanegashima. A Calanthe with yellow flowers in a spike about 10" long was in bloom in November. The composite in the background is Ligularia.



A display of cascade and pot culture chrysanthemums at Okayama. This is a typical outdoor display technique.

Spider type chrysanthemum is typical of one of the many kinds of mums displayed during early November.

